गांधी जी का जन्तर

तुम्हें एक जन्तर देता हूं। जब भी तुम्हें सन्देह हो या तुम्हारा अहम् तुम पर हावी होने लगे, तो यह कसौटी आजमाओ :

जो सबसे गरीब और कमजोर आदमी तुमने देखा हो, उसकी शकल याद करो और अपने दिल से पूछो कि जो कदम उठाने का तुम विचार कर रहे हो, वह उस आदमी के लिए कितना उपयोगी होगा। क्या उससे उसे कुछ लाभ पहुंचेगा ? क्या उससे वह अपने ही जीवन और भाग्य पर कुछ काबू रख सकेगा ? यानि क्या उससे उन करोड़ों लोगों को स्वराज्य मिल सकेगा जिनके पेट भूखे हैं और आत्मा अतृप्त है ?

तब तुम देखोगे कि तुम्हारा सन्देह मिट रहा है और अहम् समाप्त होता जा रहा है।

मो. क. गांधी

स्वतन्त्र भारत में स्कूल शिक्षा

राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्
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प्रकाशन सहयोग

सी.एन. राव, अध्यक्ष, प्रकाशन विभाग

प्रभाकर द्विवेदी	**मुख्य सम्पादक**	यू. प्रभाकर राव	**मुख्य उत्पादन अधिकारी**
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राजपाल	**सहायक सम्पादक**	रती राम	**उत्पादन सहायक**

आवरण

शान्तो दत्त, चंद्र प्रकाश टंडन

प्रकाशन विभाग में सचिव, राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्, नई दिल्ली 110016 द्वारा प्रकाशित तथा एस.पी. इलेक्ट्रोनिक्स, 4771/23, भरत राम रोड, दरियागंज, नई दिल्ली 110002 द्वारा फ़ोटो कम्पोज़ होकर मेसर्स तुलसी प्रिंटर्स, पाटलिपुत्र इंडस्ट्रियल एस्टेट, पटना (बिहार) द्वारा मुद्रित।

प्राक्कथन

भारत एक विशाल देश है। इसकी सीमाओं के अन्तर्गत अनेक भाषाएं बोली जाती हैं और यहां के लोगों को बहुत सी संस्कृतियां धरोहर में मिली हैं। स्वतन्त्रता-प्राप्ति के बाद, जीवन के सभी क्षेत्रों और लोगों की कार्य-प्रणाली में अत्यधिक सुधार हुआ है। शिक्षा के क्षेत्र में विकास की गति अधिक तीव्र रही है और उसमें कुछ मूलभूत परिवर्तन किये गए हैं। गत 41 वर्षों में जो शैक्षिक प्रगति हुई है, उसका सर्वांगीण सर्वेक्षण करना कठिन होगा।

पिछले 26 वर्षों में राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद् ने शैक्षिक सुधारों में सक्रिय भाग लिया है और परिषद् में तत्सम्बन्धी आंकड़े तथा जानकारी भी उपलब्ध है। अतः यह निश्चय किया गया है कि देश में किये गए शैक्षिक सुधारों के मुख्य लक्षणों पर एक प्रबन्ध तैयार किया जाये जिसमें पाठकों को उनका सामान्य परिचय मिल सके। हमारा यह आशय नहीं था कि हम इस प्रबन्ध में उनका विस्तृत ब्यौरा दें। हमने यहाँ शिक्षा और विशेष रूप से स्कूल शिक्षा के क्षेत्र में केवल उन परिवर्तनों का वर्णन किया है जिन से नई दिशाओं का निर्देश मिला है। यहां यह कहना भी समुचित प्रतीत होता है कि यदि हम इस प्रबन्ध की सीमित परिधि के कारण कुछ पक्षों से पूर्ण न्याय नहीं कर सके तो इसका मतलब यह नहीं कि वे अपेक्षतया कम महत्वपूर्ण हैं।

प्रबन्ध के आरम्भ में हमने उन शिक्षा पद्धतियों का वर्णन किया है जो प्राचीन काल से लेकर, समय-समय पर भारत में प्रचलित रही हैं। इसमें शिक्षा की मुख्य प्रक्रियाओं का वर्णन करते समय, स्कूल शिक्षा को विशेष महत्व दिया गया है। इस प्रबन्ध में वर्णित शिक्षा के सभी पक्षों को विकसित करने में परिषद् ने निस्सन्देह सक्रिय भाग लिया है, किन्तु राज्य सरकारों ने भी इस कार्य में महत्वपूर्ण भूमिका निभाई है। हमें विश्वास है कि भविष्य में भी वे इसी प्रकार सार्थक योग देती रहेंगी। इस क्षेत्र में राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद् (रा० शै० अनु० प्र० प०) को अब तक जो भी उपलब्धियां मिली हैं, वे राज्यों की

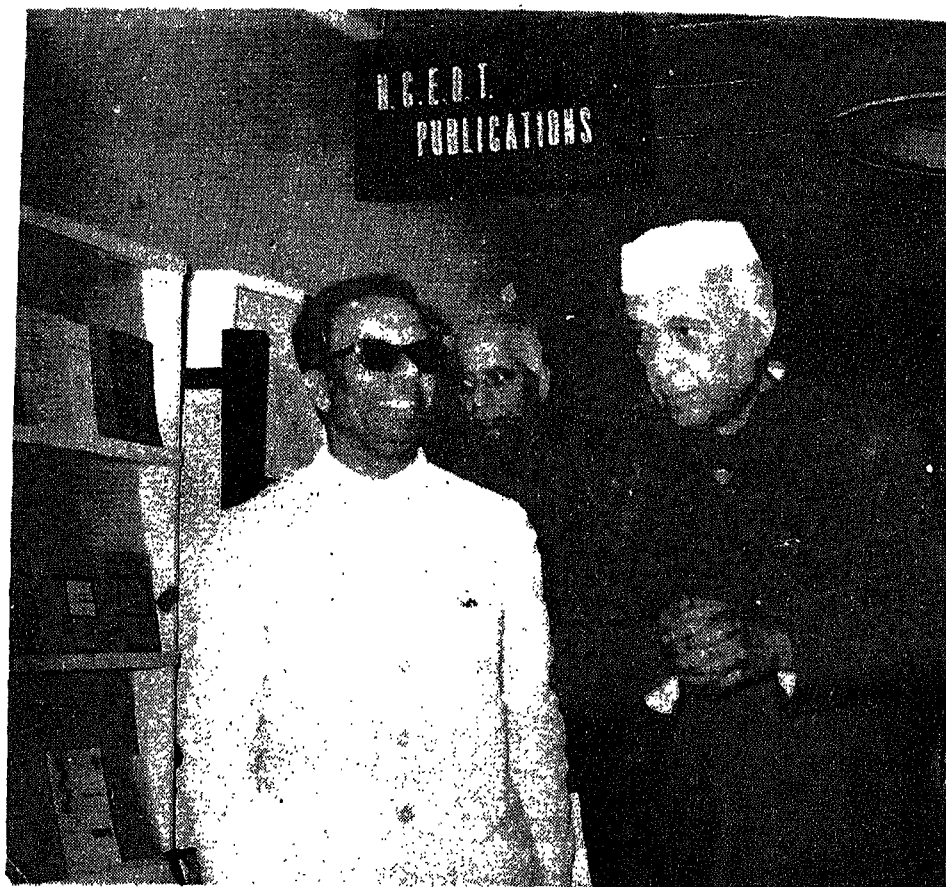
निरन्तर एवं सक्रिय साझेदारी का परिणाम हैं। प्रबन्ध के अन्त में, राष्ट्रीय शिक्षा नीति तथा राष्ट्रीय संसद् द्वारा सम्मत उसकी कार्रवाई-योजना के क्रियान्वयन के फलस्वरूप जो प्रवृत्तियां देखने में आई हैं, उनका वर्णन किया गया है।

मैं अपने सभी सहयोगियों का अनुगृहीत हूँ, जिन्होंने इस प्रबन्ध के लिए आवश्यक जानकारी को संगृहीत तथा संक्षिप्त करने का कठिन प्रयास किया है। राष्ट्रीय शिक्षा संस्थान के सभी विभागाध्यक्षों, केन्द्रीय शैक्षिक प्रौद्योगिकी संस्थान तथा रा० शै० अनु० प्र० परिषद् के दिल्ली स्थित संघटकों ने प्रबन्ध के संकलन के लिए जानकारी, दस्तावेज़ तथा आंकड़े जुटाये हैं। मैं प्रबन्ध के लिये नियुक्त समिति के सदस्यों का भी कृतज्ञ हूँ जिन्होंने इसे विकसित करने के लिए विशेष प्रयास किया है। सामग्री का हिन्दी रूपांतर श्री हरिवंश लूथरा ने किया है, जिसके लिए मैं उनका आभारी हूँ। मुझे आशा है कि अध्यापकगण, प्रशिक्षक तथा स्कूली शिक्षा से सम्बद्ध अन्य व्यक्ति, इसका व्यापक रूप से अध्ययन एवं स्वागत करेंगे।

पी० एल० मल्होत्रा
निदेशक

नई दिल्ली राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्

स्वतन्त्र भारत में स्कूल शिक्षा

1963

विज्ञान भवन, नई दिल्ली में आयोजित राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद् के प्रकाशनों की एक प्रदर्शनी में तत्कालीन केन्द्रीय शिक्षा मंत्री श्री हुमायूँ कबीर तथा प्रधान मंत्री पं. जवाहरलाल नेहरू।

परिचय

शिक्षा, व्यक्ति की आर्थिक एवं सामाजिक प्रगति का प्रभावी साधन है, इस बात को सभी स्वीकार करते हैं। राष्ट्रीय विकास के लिए भी, शिक्षा को सर्वाधिक शक्तिशाली उपकरणों में गिना जाता है, क्योंकि यह नागरिक को राष्ट्रीय विकास के लिए आवश्यक प्रयासों में सक्रिय भाग लेने के योग्य बनाती है। भारत जैसे विकासशील देश में जहां वैज्ञानिक तथा प्रौद्योगिक विकास के फलस्वरूप जीवन शैली में मूलभूत परिवर्तन हो रहा है, शिक्षा को लोगों की गुणवत्ता सुधारने का प्रबल साधन माना जाने लगा है।

भारत के सन्दर्भ में शिक्षा से अपेक्षा की जाती है कि वह मानव संसाधनों के विकास के लिए उत्प्रेरक की भूमिका निभाएगी तथा उपयुक्त ज्ञान, कौशल, मूल्यों तथा मनोवृत्तियों के विकास द्वारा, व्यक्ति तथा समाज की प्रगति को ठोस आधार तथा निरन्तरता प्रदान करेगी। यह आशा भी की जाती है कि वह लोगों को समुत्थान-शक्ति प्रदान कर, उन्हें भावी चुनौतियों का मुकाबला करने के योग्य बनाएगी। शैक्षिक प्रयासों का उद्देश्य ऐसे आत्म-विश्वासी व्यक्तियों का सर्जन होना चाहिए जिनकी लोकतांत्रिक मूल्यों तथा धर्म-निरपेक्षता में दृढ़ आस्था हो और जो अनेक भाषा-भाषियों, भिन्न धर्मों के अनुयायिओं तथा अलग-अलग जीवन शैलियों के समर्थकों में से एक संकलित राष्ट्र का निर्माण करने के लिए उत्सुक हों।

शिक्षा का विकास—ऐतिहासिक पृष्ठभूमि

भारत में शिक्षा की एक दीर्घ परम्परा है। प्राचीन काल में एक ओर, तक्षशिला तथा नालन्दा विश्वविद्यालयों जैसी संगठित संस्थाओं में औपचारिक शिक्षा प्रदान की जाती थी, दूसरी ओर, आश्रमों में प्रतिष्ठित

आचार्यों की देख-रेख में शिष्य अनौपचारिक रूप से विद्या ग्रहण करते थे।

अठारहवीं शताब्दी के अन्त तक भारत ने अपनी शिक्षा प्रणाली को सुव्यवस्थित कर लिया था। देशी शिक्षा प्रणाली में दो प्रकार की संस्थाएं थीं। प्रथम श्रेणी में पाठशालाएं तथा मदरसे थे जिनमें मुख्य रूप से धार्मिक शिक्षा दी जाती थी। दूसरी श्रेणी की संस्थाओं में धर्म-निरपेक्ष शिक्षा की व्यवस्था थी तथा वहां पढ़ने, लिखने तथा गणित की प्रारम्भिक शिक्षा दी जाती थी। उस समय शासन द्वारा संगठित अथवा सहायता-प्राप्त स्कूलों का चलन नहीं था। अधिकांश संख्या उन संस्थाओं की थी जिन्हें स्वैच्छिक रूप से संगठित किया गया था और जो खुशहाल लोगों के विशेष वर्गों की आवश्यकताओं को पूरा करती थीं।

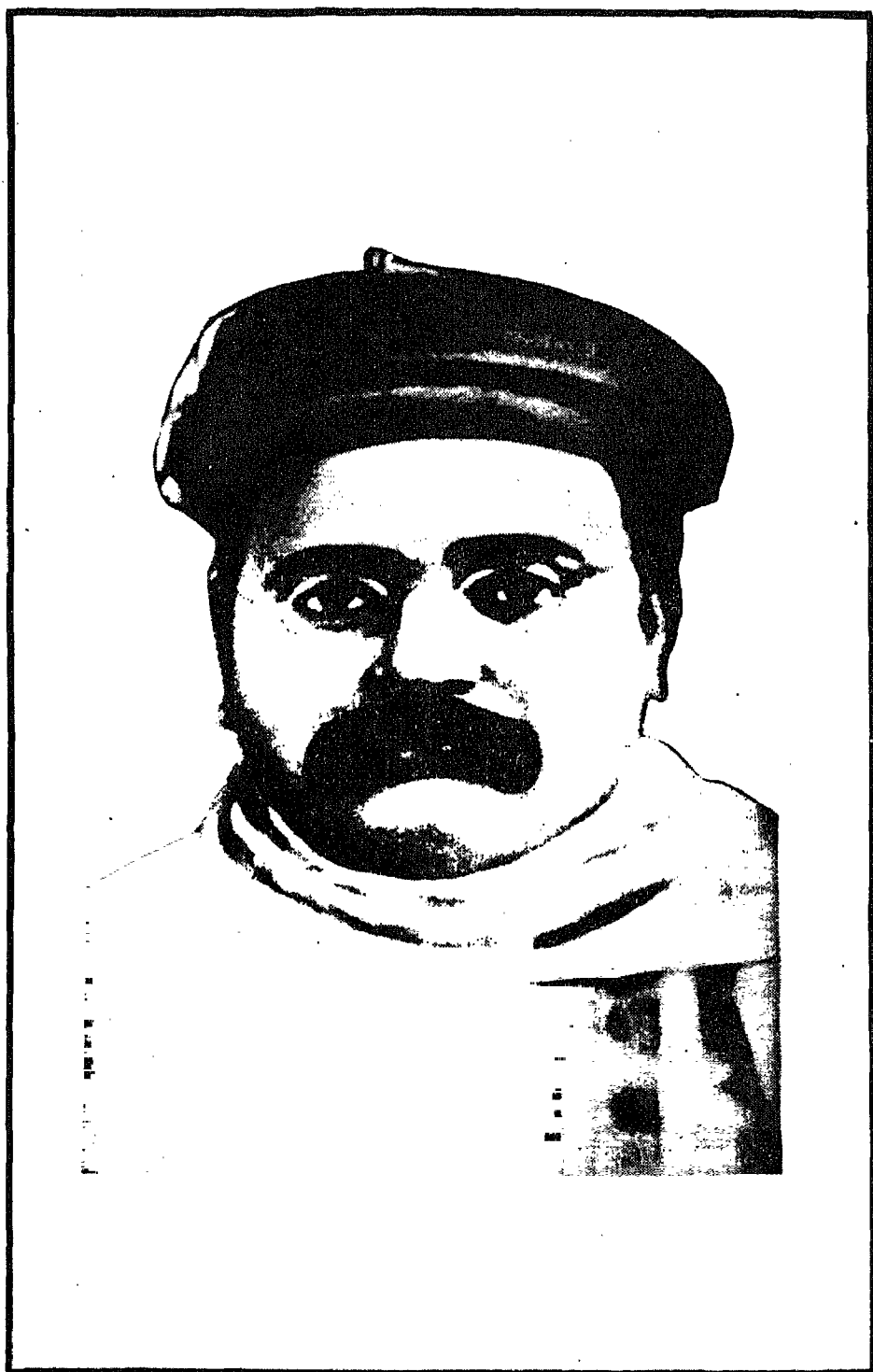
ब्रिटिश शासन में शैक्षिक स्थिति

ब्रिटिश शासन के दौरान, भारतीय शैक्षिक प्रणाली ने क्रमशः विस्तृत एवं संगठित रूप धारण कर लिया था। ब्रिटिश अधिकारियों ने 1835 ई० में शिक्षा-सम्बन्धी, प्रथम नीति-घोषणा मैकाले की टिप्पणी के साथ की थी । तदुपरान्त 1854 में 'कोर्ट ऑफ डायरेक्टर्ज़' की विज्ञप्ति जारी की गई जो सामान्यतया 'वुड की विज्ञप्ति' के नाम से जानी जाती है। उसमें शिक्षा की बढ़ोतरी के लिए वित्तीय सहायता की नीति भी निर्धारित की गई थी। शिक्षा विभागों की स्थापना तथा गैर-सरकारी संस्थाओं को अनुदान देने की सिफ़ारिश के अतिरिक्त, विज्ञप्ति में तीन महाप्रान्तीय नगरों—कलकत्ता, मद्रास तथा बम्बई में विश्वविद्यालय स्थापित करने का सुझाव भी दिया गया था।

ब्रिटिश सरकार की कोशिश थी कि अंग्रेज़ी के माध्यम द्वारा पाश्चात्य शिक्षा का प्रचार एवं प्रसार किया जाये, जबकि प्राच्यविद शिक्षा को भारतीय संस्कृति के अनुरूप बनाने के लिए प्रयत्नशील थे। भारत में अंग्रेज़ी शिक्षा की व्यवस्था करने तथा उसके प्रचार के लिए सहायता देने का मूल उद्देश्य यह था कि "यहां के लोग रंग-रूप में हिन्दुस्तानी होते हुए भी, अंग्रेजों के आचार, विचार, चिन्तन तथा रुचियों को अपना लें।" शिक्षा के ये लक्ष्य, ब्रिटिश सरकार के

उपनिवेशक तथा साम्राज्यिक उद्देश्यों से प्रेरित थे। ब्रिटिश शासक चाहते थे कि भारत में वे एक ऐसी श्रेणी या श्रेणियों का निर्माण करें जो उनके प्रति वफादार बनी रहें तथा उनके बढ़ते हुए साम्राज्य के प्रशासन में उनकी सहायता करें।

शिक्षा के क्षेत्र में ब्रिटिश शासकों की एक उल्लेखनीय देन यह थी कि सरकारी अथवा सरकार से सहायता-प्राप्त संस्थाओं में शैक्षिक सुविधाएं, सभी नागरिकों को समान रूप से उपलब्ध थीं। किन्तु जिस शिक्षा पद्धति को उन्होंने आरम्भ किया, वह मुख्य रूप से उच्च वर्ग के लोगों के लिये थी और बहु-संख्यक गरीब लोगों की शिक्षा की उपेक्षा की गई थी। यह व्यवस्था अधोमुखी निस्स्यन्दन सिद्धान्त (Downward Filteration Theory) पर आधारित थी जिसके अनुसार यह अपेक्षा की जाती है कि संस्कृति उच्च वर्ग के लोगों के माध्यम से निम्न श्रेणी के लोगों तक पहुंच जायेगी। व्यापक अनक्षरता के उन्मूलन तथा प्रारम्भिक शिक्षा के सर्व सुलभीकरण के लिये कोई यत्न नहीं किया गया और न ही प्रौढ़ शिक्षा के कार्यक्रमों को विकसित करने की कोई चेष्टा की गई।

राष्ट्रीय विचारधारा इस पक्ष में थी कि शिक्षा प्रणाली से सभी लोगों को एक समान शैक्षिक अवसर मिलने चाहिए तथा शिक्षा का उपयोग, सामाजिक एवं आर्थिक परिवर्तन के लिए साधन के रूप में किया जाना चाहिए। राष्ट्रीय आन्दोलन के नेताओं ने केन्द्रीय सरकार को इस बात पर राज़ी करने की चेष्टा भी की कि वह सभी बच्चों के लिये न्यूनतम सामान्य शिक्षा की व्यवस्था करे जो निशुल्क एवं अनिवार्य हो। इस दिशा में पहला कारगर कदम 1881 में उठाया गया। जब दादा भाई नारोजी ने हंटर आयोग के नाम से विख्यात प्रथम शिक्षा आयोग के सम्मुख अपनी गवाही में यह मांग प्रस्तुत की कि सभी बच्चों के लिए चार वर्षों की अनिवार्य शिक्षा की व्यवस्था की जाये। स्वर्गीय श्री गोपाल कृष्ण गोखले ने इसी मांग को दोहराया, जब 1910 में उन्होंने केन्द्रीय विधान सभा (1910-12) में इसी विषय पर प्रस्ताव रखा तथा 1912 में एक विधेयक इस उद्देश्य से प्रस्तुत किया कि केन्द्रीय सरकार प्रारम्भिक शिक्षा के सर्वसुलभीकरण के उत्तरदायित्व को स्वीकार करे। यद्यपि गोखले का यह प्रयास असफल रहा, किन्तु भारतीय नेता, जनता में, अनिवाय प्रारम्भिक शिक्षा की मांग के पक्ष में चेतना जागृत करने में सफल हो गए। परिणामस्वरूप, 1918 से 1931 के बीच कई

नव-निर्वाचित प्रान्तीय विधान सभाओं ने अनिवार्य शिक्षा सम्बन्धी कानून पारित कर दिये। प्रारम्भिक शिक्षा को बढ़ावा देने तथा शिक्षा के अवसरों के समीकरण के उद्देश्य से, 1944 में युद्धोत्तर शैक्षिक विकास योजना प्रकाशित हुई जो सार्जेंट योजना के नाम से प्रसिद्ध है। इस योजना में 6 से 14 वर्ष तक के सभी बच्चों के लिये प्रारम्भिक शिक्षा को निशुल्क तथा अनिवार्य बनाने का सुझाव दिया गया और इसे चरणों में लागू किया जाने की सिफारिश की गई। यह प्रयास प्रशंसनीय था किन्तु इसे क्रियान्वित न किया जा सका क्योंकि भारतीय समाज उस समय स्वतन्त्रता के लिये संघर्ष के कारण अपूर्व हलचल के दौर में से गुज़र रहा था। एक लम्बे संघर्ष के बाद, 1947 में देश को आज़ादी मिल गई।

ब्रिटिश शासन ने अपनी आवश्यकताओं के संदर्भ में, शिक्षा प्रणाली को सुधारने तथा उसे अधिक कुशल बनाने के लिए, कई आयोगों तथा समितियों द्वारा, समय-समय पर उसका मूल्यांकन करवाया किन्तु शिक्षा के मूल उद्देश्यों में कोई अन्तर नहीं आया। तत्कालीन शिक्षा पद्धति में उदार शिक्षा पर निरन्तर बल दिया जाता रहा जिसका देश की विकासात्मक आवश्यकताओं के साथ कोई सम्बन्ध नहीं था। चूँकि वह शिक्षा प्रणाली राष्ट्र की आकांक्षाओं के अनुरूप नहीं थी, उसके प्रति लोगों के असन्तोष की भावना बढ़ती गई। इसके फलस्वरूप देश में शिक्षा के कई वैकल्पिक माडल सुझाये गये और उनके प्रयोग की मांग की गई। 1927 में महात्मा गांधी ने बुनियादी शिक्षा की योजना को प्रस्तुत किया जिसके अन्तर्गत सब बच्चों के लिये 7 वर्षों की शिक्षा को सुलभ कराने का प्रस्ताव था। इसमें शिक्षा के माध्यम के लिये मातृ-भाषा की परिकल्पना की गई थी तथा किसी उत्पादक शिल्प-क्रिया को शिक्षा का केन्द्र बनाने की बात कही गई थी। बुनियादी शिक्षा का प्रस्ताव, देश में राष्ट्रीय शिक्षा को विकसित करने का प्रथम प्रयास था जिसमें शिक्षा को लोगों की आवश्यकताओं एवं आकांक्षाओं के अनुरूप बनाने की चेष्टा की गई थी। उसके बाद देश में बहुत सी शिक्षा संस्थाएं, बुनियादी शिक्षा के सिद्धान्तों के आधार पर स्थापित की गईं।

1947 में शिक्षा की स्थिति

ब्रिटिश शासन के दौरान, शिक्षा के क्षेत्र में कई उपलब्धियों के

बावजूद, स्वतन्त्रता-प्राप्ति के समय (1947) में देश में शिक्षा की स्थिति प्रायः हर लिहाज़ से कमज़ोर थी। हज़ारों ग्रामों तथा ग्रामीण आवासों में, स्कूलों का निरन्तर अभाव था। 6-11 आयुवर्ग के तीन, तथा 11-14 आयुवर्ग के 11 बच्चों में से केवल एक एक बच्चा स्कूलों में भर्ती था। 14-17 वर्ष के युवकों में से मुश्किल से एक माध्यमिक स्कूल में दाखिल था। स्कूलों तथा विश्वविद्यालयों—दोनों में व्यावसायिक शिक्षा का विकास सर्वथा असन्तोषजनक था। विज्ञान एवं प्रौद्योगिकी के क्षेत्र में प्रशिक्षित अध्यापकों की बहुत कमी थी। देश के भिन्न-भिन्न प्रान्तों में, नगरीय लोगों और ग्रामीणों, लड़के और लड़कियों तथा सामान्य जनता और अनुसूचित जातियों एवं जनजातियों के बीच शैक्षिक असन्तुलन बहुत ज़्यादा था। शिक्षा और विशेष रूप से स्कूल शिक्षा की गुणात्मकता तथा स्तर काफ़ी असन्तोषजनक थे। अंग्रेजी पर ज़ोर अधिक था तथा विज्ञान, गणित एवं भारतीय भाषाओं की ओर विशेष ध्यान नहीं दिया जाता था। देश में केवल 14 प्रतिशत लोग साक्षर थे और शिक्षा पर कुल व्यय, राष्ट्रीय आय के आधे प्रतिशत से भी कम था।

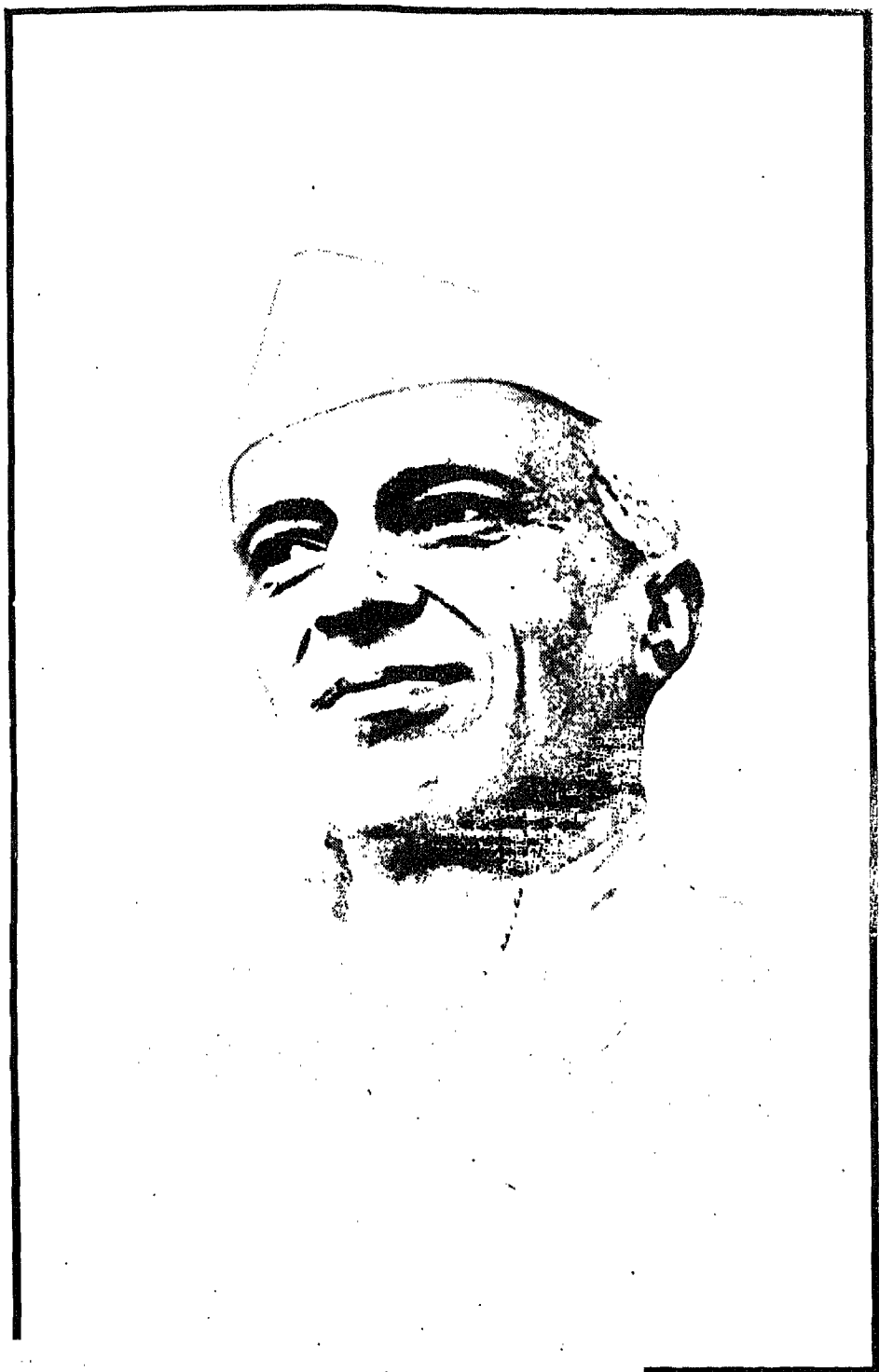
स्वतन्त्रता के बाद शिक्षा का पुनर्निर्माण

स्वतन्त्रता-प्राप्ति के बाद महसूस किया गया कि स्वाधीनता को सार्थक बनाने के लिये, देश में सामाजिक एवं आर्थिक परिवर्तन तथा लोकतन्त्र, सामाजिक न्याय एवं धर्म-निरपेक्षता पर आधारित नई सामाजिक पद्धति की स्थापना आवश्यक है। इस उद्देश्य की पूर्ति के लिये, भारत ने राष्ट्रीय पुनर्निर्माण के विराट कार्य को सम्पन्न करने का बीड़ा उठाया। इस बात को निर्विवाद रूप से मान लिया गया कि शिक्षा प्रणाली को पुनर्गठित तथा अनुप्राणित किये बिना, स्वतन्त्र भारत को निरन्तर प्रगति तथा समृद्धि के पथ पर आगे ले जाना असम्भव प्रायः है। अतः स्वतन्त्रता प्राप्ति के बाद शिक्षा के व्यवस्थित विकास का कार्य शुरू किया गया। 1950 में भारतीय संविधान के लागू होने, तथा, 1951 में देश व्यापी आर्थिक एवं सामाजिक आयोजन के प्रारम्भ होने पर, जवाहर लाल नेहरू ने महसूस किया कि शिक्षा प्रणाली के ढांचे, लक्ष्यों, पाठयक्रमों, प्रक्रियाओं तथा संरचना में आमूल परिवर्तन की आवश्यकता

है। वे मानव-प्रयास के प्रत्येक क्षेत्र में आधुनिकीकरण की प्रक्रिया द्वारा, भारतीय समाज को रूपान्तरित करना चाहते थे। उन्होंने एक ऐसे नये समाज की परिकल्पना की थी जो वास्तव में आधुनिक, स्वतन्त्र, समतावादी तथा लोकतांत्रिक हो तथा समाजवाद, धर्म निरपेक्षता एवं वैज्ञानिक चिन्तन में जिसकी पूर्ण आस्था हो। उनका मत था कि ऐसे समाज के निर्माण के लिये, शिक्षा को निर्णायक भूमिका निभानी होगी। उन्होंने कहा था कि यदि ध्यान से सोचा जाये तो कोई भी विषय शिक्षा से अधिक महत्वपूर्ण नहीं है। किसी भी राष्ट्र के निर्माण एवं उत्थान का उत्तरदायित्व, देश के नर-नारियों पर रहता है और शिक्षा से ही इन नर-नारियों के निर्माण की अपेक्षा की जाती है।

यह कहना आवश्यक प्रतीत होता है कि आधुनिक औद्योगिक समाज के निर्माण में संलग्न जवाहरलाल नेहरू ने अतीत से पूर्ण विच्छेद की कभी परिकल्पना नहीं की। वे भारतीय संस्कृति के दार्शनिक एवं आध्यात्मिक आधार-स्तम्भों से अत्यधिक प्रभावित हुए थे। उन्हें भारतीय सभ्यता तथा संस्कृति की प्रचुरता पर गर्व था। जब भारत में वैज्ञानिक तथा औद्योगिक परिवर्तन लाने के लिए योजना बनाई जा रही थी तो वे नीति के निर्धारकों और देशवासियों को निरन्तर याद दिलाते रहे कि वे भारत की सांस्कृतिक धरोहर की अनदेखी न करें। यही कारण है कि उनकी शिक्षा-नीति में देश की सांस्कृतिक तथा आध्यात्मिक धरोहर के परिरक्षण का महत्वपूर्ण स्थान है।

नीति निर्देश

भारत में शिक्षा-प्रणाली के पुनर्गठन का कार्य, 1948 में सर्वपल्ली राधाकृष्णन की अध्यक्षता में "विश्वविद्यालय शिक्षा आयोग" की नियुक्ति के साथ आरम्भ हुआ। इस आयोग का उद्देश्य विश्वविद्यालयों को शिक्षा की स्थिति का पुनरावलोकन कर, ऐसे सुधार सुझाना था जिस से भारत के सामाजिक एवं आर्थिक विकास के लिए आवश्यक, वैज्ञानिक, तकनीकी तथा अन्य मानव संसाधन उपलब्ध हो सकें। अप्रैल, 1950 में केन्द्रीय शिक्षा सलाहकार बोर्ड ने विश्वविद्यालय शिक्षा आयोग की रिपोर्ट पर विचार किया तथा उसके अधिकांश सुझावों को स्वीकार कर लिया। ये विश्वविद्यालयों एवं महाविद्यालयों की शिक्षा, अनुसंधान तथा परीक्षाओं को सुधारने के सम्बन्ध में थे। इन में उच्च

शैक्षिक संस्थाओं के पाठ्यक्रमों को आधुनिक बनाने पर भी बल दिया गया था ताकि उन्हें अग्रणी देशों के पाठ्य विवरणों के समकक्ष बनाया जा सके। आयोग के जाँच परिणामों के आधार पर उच्च शिक्षा के विस्तार का काम आरम्भ किया गया। नए विश्वविद्यालय स्थापित किये गए तथा देश के भिन्न भागों में भारतीय प्रौद्योगिकी संस्थानों तथा कई राष्ट्रीय विज्ञान प्रयोगशालाओं की स्थापना की गई। उच्च अनुसंधान के केन्द्रों में आयुर्विज्ञान, कृषि तथा व्यवहारिक विज्ञान में अनुसंधान का कार्य होने लगा, जिसके परिणामस्वरूप, लगभग एक दो दशक में, निपुण वैज्ञानिकों, इन्जीनियरों तथा डाक्टरों की संख्या में संतोषजनक वृद्धि हुई तथा देश को काफ़ी मात्रा में तकनीकी ज्ञान से सम्पन्न मानव संसाधन उपलब्ध हो गए जिससे भावी विकास एवं नवीन प्रक्रियाओं को एक सुदृढ़ आधार मिल गया। इससे समाज और विशेष रूप से अर्थव्यवस्था एवं उद्योगों के रूपांतरण में बड़ी सहायता मिली। शिक्षा आयोग ने विश्वविद्यालयों की स्वायत्तता तथा विश्वविद्यालय अनुदान आयोग एवं ग्रामीण विश्वविद्यालयों की स्थापना के सम्बन्ध में भी सिफ़ारिशें की थीं। इनके फलस्वरूप 1956 में विश्वविद्यालय अनुदान आयोग स्थापित किया गया।

विश्वविद्यालय शिक्षा आयोग ने, उच्च शिक्षा की त्रुटियों का वर्णन करते समय, माध्यमिक शिक्षा प्रणाली की कमियों की ओर भी संकेत किया था। 1952 में भारत सरकार ने डा० लक्ष्मणस्वामी मुदलिअर की अध्यक्षता में माध्यमिक शिक्षा आयोग की नियुक्ति की। आयोग को, भारत में माध्यमिक शिक्षा की प्रवर्तमान स्थिति का अध्ययन करने तथा उसके पुनर्गठन एवं सुधार के लिए उपाय सुझाने का सुनिश्चित कार्य सौंपा गया। आयोग ने 1953 में अपनी रिपोर्ट प्रस्तुत की जिसमें उसने स्कूल शिक्षा के लिए 11 वर्ष तथा प्रथम उपाधि के लिए 3 वर्ष की अवधि का प्रस्ताव किया। आयोग ने जो अन्य सिफ़ारिशें कीं उनमें, 'अवर माध्यमिक स्तर के बाद पाठ्यक्रम का नानारूपकरण', 'बहुमुखी स्कूलों की स्थापना,' 'स्वास्थ्य एवं शारीरिक शिक्षा के लिए व्यापक कार्यक्रमों का संचालन,' 'पाठ्यपुस्तक-पुस्तकालयों की सुविधाओं में सुधार' तथा 'विशिष्ट पुस्तकालयों की स्थापना' सम्मिलित थीं। आयोग ने अध्यापकों के प्रशिक्षण में गुणात्मक सुधार, अध्यापकों के व्यावसायिक विकास के लिए सेवाकालीन प्रशिक्षण तथा उसकी प्रतिष्ठा एवं सेवा की शर्तों में सुधार पर भी बल दिया। माध्यमिक शिक्षा आयोग की सिफ़ारिशों की क्रियान्विति के फलस्वरूप स्कूल सुविधाओं में व्यापक

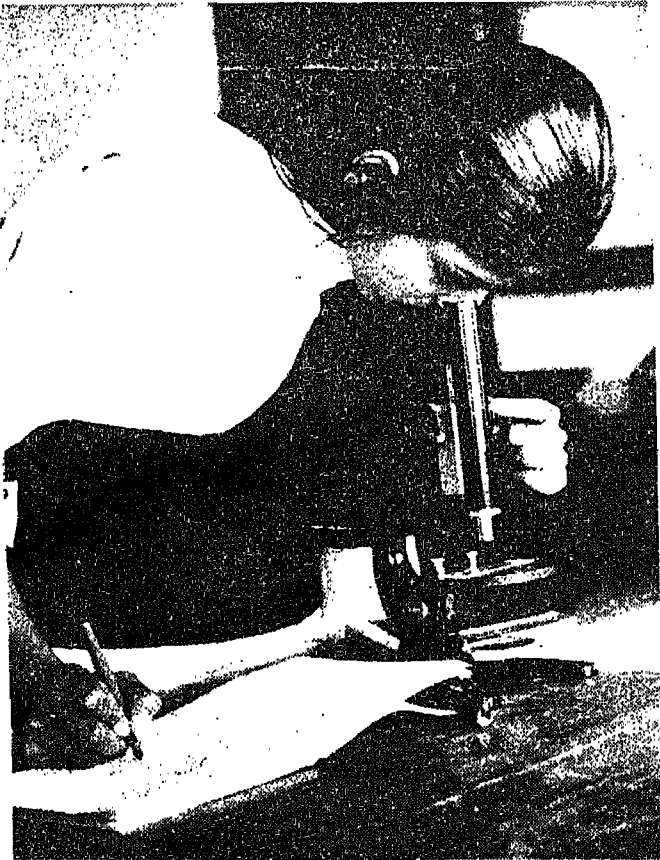
वृद्धि हुई किन्तु शिक्षा के गुणात्मक सुधार के विषय में कुल मिलाकर सन्तोषजनक उन्नति न हो सकी। ऐसी स्थिति में भारत सरकार ने 1964 में, प्रो० दौलत सिंह कोठारी की अध्यक्षता में शिक्षा आयोग की नियुक्ति की। आयोग से अपेक्षा की गई कि वह शिक्षा के सभी स्तरों और पहलुओं का पुनरीक्षण कर, सरकार को राष्ट्रीय शिक्षा नीति के सम्बन्ध में सलाह दे। आयोग ने विचाराधीन विषयों पर गहराई से विचार-विमर्श किया और शिक्षा प्रणाली के पुनर्गठन के लिए व्यापक सिफारिशें कीं। उसने इस तथ्य को दोहराया कि राष्ट्र के सामाजिक, आर्थिक तथा सांस्कृतिक रूपान्तरण के लिए शिक्षा एक शक्तिशाली साधन है और राष्ट्र के विकास के लिये, उसे इस महत्वपूर्ण भूमिका को निभाना होगा। उसने शिक्षा के रूप को बदलने तथा उसे लोगों के जीवन, आवश्यकताओं तथा आकांक्षाओं के अनुरूप बनाने की सिफारिश की। इस सम्बन्ध में आयोग ने सुझाव दिया कि देश की विकास सम्बन्धी आवश्यकताओं की पूर्ति के लिये उच्च माध्यमिक स्तर पर शिक्षा का व्यावसायीकरण होना चाहिए। इसी उद्देश्य की पूर्ति के लिए, विज्ञान-शिक्षा के स्तर में सुधार तथा कार्य-अनुभव की व्यवस्था द्वारा, शिक्षा को उत्पादिता से संबंधित कर देना चाहिए।

शिक्षा आयोग की सिफारिशों और उस पर व्यापक विचार-विमर्श के बाद, भारत सरकार ने 1968 में राष्ट्रीय शिक्षा नीति पर एक प्रस्ताव प्रकाशित किया। इस प्रस्ताव में आने वाले वर्षों में, शैक्षिक विकास के मार्गदर्शन के लिए 17 सिद्धान्तों का प्रतिपादन किया गया था। इसमें इस बात की ओर ध्यान दिलाया गया कि शिक्षा के आमूल पुनर्गठन के लिए पाठ्य विषयों का रूपान्तरण करना होगा ताकि उन्हें जीवन के लिए अधिक उपयोगी बनाया जा सके। शिक्षा प्रणाली को नये सिरे से संगठित करने के लिए यह भी आवश्यक होगा कि शिक्षा को सर्वसुलभ बनाने तथा उसके सभी स्तरों पर गुणवत्ता को सुधारने के लिये, निरन्तर एवं तीव्र प्रयास किये जाएँ, विज्ञान एवं टैक्नालोजी के विकास पर बल दिया जाये, तथा नैतिक एवं सामाजिक मूल्यों को छात्रों के मन में बिठाया जाये, प्रस्ताव में यह भी कहा गया था कि "शिक्षा प्रणाली ऐसे चरित्रवान् तथा सकुशल युवक-युवतियों को तैयार करे जो राष्ट्रीय सेवा तथा विकास के लिये वचनबद्ध हों।"

यद्यपि देश में शिक्षा के सभी स्तरों पर अभूतपूर्व परिमाणात्मक विकास हुआ, तथापि गुणात्मक सुधारों के लिये जो प्रयास किये गए, उन्हें अपेक्षित सफलता प्राप्त नहीं हुई। इसका कारण यह था कि 1968 में निर्धारित नीतियों तथा आयोजित कार्यक्रमों को कार्य रूप देने के लिये आवश्यक वित्तीय और संघटनात्मक सहायता उपलब्ध नहीं हुई। अत: सुलभीकरण , गुणवत्ता तथा उपयोगिता की समस्याओं के समाधान की दिशा में अभी बहुत कुछ करना बाकी था। यह स्वीकार किया गया कि रेखीय सुधार तथा सुधार की प्रवर्तमान गति और स्वरूप, समाज की बदलती आवश्यकताओं की पूर्ति के लिये काफी नहीं हैं। इसके साथ ही, नई चुनौतियों की विविधता तथा सामाजिक आवश्यकताओं के संदर्भ में यह आवश्यक हो गया कि शैक्षिक विकास के लिये एक नये डिज़ाइन तथा तत्कालीन वास्तविकताओं एवं भावी समस्याओं को ध्यान में रखते हुए नए नीति-निर्देशों को विकसित किया जाये। इसी संदर्भ में भारत सरकार ने मई, 1986 में एक नई राष्ट्रीय शिक्षा नीति की घोषणा की।

राष्ट्रीय शिक्षा नीति (1986) में एक ऐसी राष्ट्रीय शिक्षा पद्धति की परिकल्पना की गई है जो भारत के संविधान में वर्णित मूल सिद्धान्तों पर आधारित है। राष्ट्रीय शिक्षा पद्धति की धारणा से यह स्पष्ट संकेत मिलता है, कि ''एक निर्धारित स्तर तक, सभी छात्रों को, चाहे वे किसी भी जाति, धर्म, स्थान अथवा लिंग के हों, तुल्य गुणवत्ता की शिक्षा सुलभ होगी।'' इस नीति में शिक्षा को मानव के सर्वतोमुखी—भौतिक तथा आध्यात्मिक विकास का आधार माना गया है। यह नीति शिक्षा की उत्संस्करण की भूमिका को उजागर करती है। इसमें शिक्षा के उस पहलू का भी जिकर किया गया है जो वह संवेदनशीलता तथा प्रत्यक्ष ज्ञान को परिष्कृत करने में अदा करती है। यही गुण राष्ट्रीय सामंजस्य, वैज्ञानिक मन: स्थिति तथा मन एवं आत्मा की स्वतन्त्रता को बढ़ावा देते हैं और इस प्रकार भारतीय संविधान में निहित समाजवाद, लोकतन्त्र तथा धर्म-निरपेक्षता के लक्ष्यों की प्राप्ति में सहायता करते हैं। यह नीति, अर्थ-व्यवस्था के भिन्न स्तरों के लिए आवश्यक मानव साधनों के विकास में शिक्षा की भूमिका के महत्व को समझती है तथा उसे अनुसंधान एवं विकास की प्रगति का आधार तथा राष्ट्रीय स्वलम्बन का साधन मानती है, इस प्रकार राष्ट्रीय शिक्षा नीति की धारणा है कि शिक्षा पर किया गया व्यय, वर्तमान को सुधारने तथा भविष्य को

उज्जवल बनाने के लिये अत्यन्त लाभप्रद पूंजी-निवेश है।

राष्ट्रीय शिक्षा नीति ने उन उपक्रमणों तथा प्राथमिकताओं को निर्दैशित किया है जो एक ऐसी शिक्षा प्रणाली की संरचना के लिये आवश्यक हैं, जो लोगों को भावी चुनौतियों का मुकाबला करने के लिये तैयार कर सके। तत्पश्चात् अगस्त, 1981 में राष्ट्रीय शिक्षा नीति के क्रियान्वयन के लिए, ''कार्रवाई की योजना'' को स्वीकार किया गया। इस योजना में नीति-निर्देशों को क्रियान्वित करने के लिए आवश्यक कार्यवाही की ओर संकेत किया गया है। इसमें मोटे तौर से उस नीति का वर्णन भी किया गया है जिसके अन्तर्गत शैक्षिक कार्यक्रमों के प्रतिपादन

तथा क्रियान्वयन से सम्बद्ध भिन्न-भिन्न विभाग तथा एजेंसियां, ब्यौरेवार योजनाओं को तैयार कर सकती हैं। इस प्रकार राष्ट्रीय शिक्षा नीति तथा 'कार्रवाई की योजना' ने आगामी वर्षों में अपेक्षित शैक्षिक सुधारों के लिये आधार तैयार कर दिया है।

विकास में प्रगति

1951 में भारत में आर्थिक तथा सामाजिक आयोजन का सूत्रपात हुआ। तभी से देश को शैक्षिक पुनर्निर्माण सम्बन्धी दो प्रमुख समस्याओं

का सामना करना पड़ा है, पहली, शैक्षिक अवसरों को समान रूप से उपलब्ध कराने के लिए, शैक्षिक सुविधाओं में सुधार तथा दूसरी, स्कूल स्तर पर शिक्षा की विषय-वस्तु तथा गुणवत्ता में सुधार। शैक्षिक विकास के भिन्न पहलुओं में जो प्रगति हुई है, उसे नगण्य नहीं कहा जा सकता यद्यपि इन समस्याओं के सन्तोषजनक समाधान के लिये अभी बहुत कुछ करना बाकी है।

प्रारम्भिक शिक्षा का सर्वसुलभीकरण

प्रारम्भिक शिक्षा का सर्वसुलभीकरण, स्वतन्त्रता-प्राप्ति में, शैक्षिक विकास के सर्वाधिक महत्वपूर्ण लक्ष्यों में माना गया है। भारत में शैक्षिक विकास की युद्धोत्तर योजना (1944) के अन्तर्गत, निःशुल्क तथा अनिवार्य प्रारम्भिक शिक्षा को 40 वर्षों की अवधि में सर्वसुलभीकरण का कार्यक्रम बनाया गया था। स्वतन्त्रता-प्राप्ति के बाद राष्ट्रीय सरकार ने

महसूस किया कि यह अवधि बहुत लम्बी है। उसने सुझाव दिया कि निःशुल्क तथा अनिवार्य प्रारम्भिक शिक्षा के सुलभीकरण की गति को तेज़ किया जाये और इस कार्य को 1960 तक पूरा कर लिया जाये। इस सिफ़ारिश को भारतीय संविधान की धारा 45 में, राज्य नीति के निदेशक सिद्धान्त के रूप में समावेश कर लिया गया और सरकार को निर्देश दिया गया कि संविधान के लागू होने के दस वर्ष के भीतर, 14 वर्ष तक की आयु के सभी बच्चों को निःशुल्क तथा अनिवार्य शिक्षा सुलभ कराने का प्रयास किया जाये। किन्तु इस संकल्प की पूर्ति के मार्ग में कई गम्भीर बाधाएं आ खड़ी हुईं जिसमें देश के विभाजन के बाद शरणार्थियों का आगमन तथा वित्तीय एवं मानवीय—दोनों प्रकार के साधनों की विषम स्थिति, प्रमुख थीं। परिणामस्वरूप, लक्ष्य-पूर्ति की तिथि को पहले 1970, फिर 1976 और तदुपरान्त 1990 तक आगे बढ़ाना पड़ा। रा.शि.नी. (1986) के अनुसार अब लक्ष्य-तिथि, 1995 निर्धारित की गई है। निरन्तर बढ़ती हुई जनसंख्या, तथा वित्तीय एवं मानव साधनों की कमी, परिकल्पित लक्ष्यों की पूर्ति में मुख्य रूप से बाधक रहे हैं। इन कठिनाइयों के बावजूद, स्वतन्त्रता के बाद के समय में, विकास की गति काफी तेज़ रही है।

1950 के बाद से स्कूली शिक्षा की सुविधाओं में महत्वपूर्ण वृद्धि हुई। प्राथमिक स्कूलों की संख्या, 1950-51 में 2,09,671 से बढ़कर 1986-87 में 5,37,399 हो गई थी। इसी अवधि में माध्यमिक स्कूलों की संख्या 13,596 से बढ़कर 1,37,196 हो गई। शैक्षिक सुविधाओं के विस्तार के साथ, बच्चों के कुल नामांकन में भी भारी बढ़ोतरी हुई, एक से पांचवीं कक्षा तक कुल नामांकन 1950-51 में 191.55 लाख से बढ़कर 1986-87 में 899.93 लाख हो गया। छटी से आठवीं कक्षाओं में नामांकन 1950-51 में 31.20 लाख से बढ़कर, 1986-87 में 287.80 लाख हो गया। पहली से आठवीं कक्षा में बच्चों की कुल संख्या 1950-51 में 222.75 लाख से बढ़कर 1986-87 में 1187.73 लाख हो गई। प्राथमिक स्तर पर नामांकन का अनुपात भी 1950-51 में 42.6 से बढ़कर 1986-87 में 95.96 हो गया। इस अवधि में माध्यमिक स्तर (छटी से आठवीं कक्षा) पर कुल नामांकन अनुपात 12.9 से 53.14 हो गया।

1950 से लेकर, प्राथमिक स्तर पर नामांकन में वृद्धि संतोषजनक रही है, किन्तु बीच में स्कूल छोड़ने की समस्या, विकास की प्रगति को लगभग नकारती रही है। पहली कक्षा में प्रविष्ट 100 बच्चों में से केवल

लगभग 40, पांचवीं कक्षा और केवल लगभग 25, आठवीं कक्षा तक पहुंचते हैं। व्यर्थता की समस्या के अध्ययन से ज्ञात हुआ है कि प्राथमिक स्कूलों में बच्चों को रोके रखने की क्षमता बहुत कम हैं। पहली या दूसरी कक्षा में जो बच्चे स्कूल को छोड़ देते हैं, उनमें से अधिकांश पुन: अनक्षरता का शिकार हो जाते हैं और इस प्रकार अनक्षरों की बढ़ती हुई संख्या में और भी वृद्धि करते हैं। परिवारों में और विशेष रूप से, समाज के कमज़ोर वर्गों के परिवारों में सामाजिक एवं आर्थिक विवशताएं, शिक्षा के प्राथमिक स्तर पर व्यर्थता के ऊंचे दर का कारण रही हैं। नामांकन को बढ़ाने तथा छात्रों को स्कूलों में रोके रखने के लिये, केन्द्रीय तथा राज्य सरकारों ने उन सामाजिक तथा आर्थिक विषमताओं को दूर करने के लिये कई कदम उठाये हैं, जो कमज़ोर वर्ग के बच्चों के शिक्षा जारी रखने में बाधक होती हैं। प्राथमिक तथा उच्चतर प्राथमिक स्कूलों में प्रेरकों की व्यवस्था, व्यर्थता को रोकने तथा प्राथमिक स्तर पर नामांकन को बढ़ाने के लिये एक महत्वपूर्ण उपाय है। आर्थिक एवं सामाजिक दृष्टि से पिछड़े हुए वर्गों के छात्रों के लाभ के लिये, जिन प्रेरकों की व्यवस्था की गई है, उनमें दोपहर का भोजन, मुफ़्त वर्दी अथवा वस्त्र, मुफ़्त पाठ्य पुस्तकें एवं लेखन-सामग्री, तथा कन्याओं के लिये उपस्थिति छात्रवृत्तियां सम्मिलित हैं। प्राथमिक स्कूलों में बच्चों की एक बड़ी संख्या को इन योजनाओं से लाभ मिल रहा है।

प्रारम्भिक शिक्षा के सुलभीकरण के प्रयासों के सिलसिले में, औपचारिक शिक्षा के विकल्प के रूप में, गैर-औपचारिक शिक्षा के कार्यक्रमों को प्रोत्साहन दिया जा रहा है। इन कार्यक्रमों के अन्तर्गत, उन बच्चों के लिये समत्व कोटि की शिक्षा की व्यवस्था की गई है जो कई सामाजिक एवं आर्थिक बाधाओं के कारण, औपचारिक स्कूलों में प्रवेश पाने में असमर्थ हैं। गैर-औपचारिक शिक्षा कार्यक्रम, केन्द्र से सहायता प्राप्त योजना के रूप में, छटी पंचवर्षीय योजना की अवधि में प्रारम्भ किया गया था। इस योजना को 9 राज्यों आंध्रप्रदेश, असम, बिहार, जम्मू-काश्मीर, मध्य प्रदेश, उड़ीसा, राजस्थान, उत्तर प्रदेश और पश्चिम बंगाल में सक्रिय रूप से क्रियान्वित किया गया है। इन राज्यों में, देश के कुल गैर-दाखिल बच्चों में से 70 प्रतिशत बच्चे रहते हैं। इस योजना का हाल ही में पुनर्गठन एवं विस्तार किया गया है, तथा इसके अन्तर्गत, उपरिलिखित राज्यों और अरुणाचल को गैर-औपचारिक

शिक्षा केन्द्रों के संचालन के लिये वित्तीय सहायता दी जा रही है। इनके अतिरिक्त, नगरों में गन्दी बस्तियों, पर्वतीय क्षेत्रों, रेगिस्तानी तथा आदिवासी इलाकों में गैर औपचारिक शिक्षा केन्द्रों की स्थापना तथा संचालन के लिए भी सहायता दी जाने लगी है। इसी योजना के अन्तर्गत, कर्मी बच्चों के लिये स्थापित तथा संचालित शिक्षा-प्रायोजनाएं भी, वित्तीय सहायता की अधिकारी हैं। आशा है कि राज्य सरकारें 1987-88 में 1.94 लाख गैर औपचारिक शिक्षा केन्द्रों के लक्ष्य के स्थान पर, 1.84 लाख केन्द्र स्थापित कर पाएंगी जिन पर 35.5244 करोड़ रुपये खर्च होने का अनुमान है। इस कार्य में अधिक से अधिक स्वैच्छिक संगठनों तथा पंचायती राज्य संस्थाओं को सम्मिलित करने के लिए सुनिश्चित कार्रवाई की जा रही है, संगठनात्मक लचीलापन, पाठ्यपुस्तकों की प्रासंगिकता, शिक्षार्थियों की आवश्यकताओं के अनुरूप पाठ्यक्रमों में विविधता तथा प्रबन्ध का विकेन्द्रीकरण, गैर औपचारिक शिक्षा कार्यक्रम की विशेषताएं हैं।

माध्यमिक शिक्षा का विस्तार

स्वतन्त्रता-प्राप्ति के बाद से माध्यमिक शिक्षा के विस्तार में भी महत्वपूर्ण प्रगति हुई है। 1949-50 में माध्यमिक स्कूलों (नवीं से

ग्यारहवीं कक्षा) की कुल संख्या केवल 6,682 थी। 1960-61 में उच्च/उच्चतर माध्यमिक स्कूलों की संख्या 17,275 थी जो बढ़कर 1986-87 में 64,240 हो गई। 1950-51 में नवीं से ग्यारहवीं कक्षाओं में कुल नामांकन 12.5 लाख था, 1986-87 में उच्च/उच्चतर माध्यमिक स्कूलों (नवीं से बारहवीं कक्षा) में कुल नामांकन 155 लाख था।

माध्यमिक शिक्षा में प्रभावी विस्तार के कई कारण थे। सरकार ने, ग्राम्य क्षेत्रों में प्राथमिक शिक्षा की सुविधाओं को बढ़ाने के लिये कारगर कार्रवाई की थी। आम लोग, जीवन की गुणात्मकता को सुधारने के लिये शिक्षा की महत्वपूर्ण भूमिका समझने लगे थे, तथा कन्याओं और आर्थिक एवं सामाजिक दृष्टि से पिछड़ी जातियों से सम्बद्ध छात्रों के लिए उदार रियायतों की व्यवस्था की गई थी। कई राज्यों ने माध्यमिक शिक्षा को निःशुल्क बना दिया था और कुछ राज्यों में तो महिलाओं के लिये उच्च माध्यमिक शिक्षा भी निःशुल्क बना दी गई थी।

उच्च माध्यमिक शिक्षा का व्यावसायीकरण

1968 में शिक्षा के सम्बन्ध में राष्ट्रीय नीति के लागू होने के बाद, शिक्षा के क्षेत्र में एक महत्वपूर्ण घटना घटी। समूचे देश में समान

शैक्षिक संरचना तथा शिक्षा के 10+2+3 ढांचे के सम्बन्ध में सहमति प्राप्त हो गई। शिक्षा आयोग (1964-66) ने +2 के स्तर पर शिक्षा के व्यावसायीकरण की सिफ़ारिश भी की थी तथा सुझाव दिया था कि उच्चतर माध्यमिक कक्षाओं में 50 प्रतिशत छात्रों के लिये व्यावसायिक पाठ्यक्रमों की व्यवस्था की जाये।

मुख्य उद्देश्य यह था कि शैक्षिक विषयों में विविधता लाकर, छात्रों को अपनी मनोवृत्तियों, अभिरुचियों तथा योग्यताओं के अनुसार अध्ययन कार्यक्रमों के चयन का अवसर दिया जाये ताकि युवाओं में रोज़गार- क्षमता बढ़े और आवश्यकता होने पर वे अपना रोजगार शुरू कर सकें, तथा आवश्यक व्यावसायिक क्षमताओं के विकास द्वारा, वर्तमान तथा उभरते हुए कार्य-क्षेत्रों के लिए कुशल मानव साधनों को उपलब्ध कराया जा सके। शिक्षा आयोग की सिफ़ारिशों को क्रियान्वित करने के लिये, उच्चतर माध्यमिक स्तर पर शिक्षा के व्यावसायीकरण को छटी पंचवर्षीय योजना में एक महत्वपूर्ण कार्यक्रम के रूप में सम्मिलित कर लिया गया। कुछ राज्यों तथा संघीय क्षेत्रों ने इस कार्यक्रम को स्कूल के 10+2 ढांचे का आवश्यक अंग बना दिया। 6 राज्यों तथा 3 संघ- प्रशासित प्रदेशों ने उच्चतर माध्यमिक शिक्षा के व्यावसायीकरण को, 1976 और 1979 के दौरान तथा 5 राज्यों एवं 2 संघीय क्षेत्रों ने 1983 और 1985 के बीच लागू किया था। 1985-86 में उच्चतर माध्यमिक स्तर पर, व्यावसायिक पाठ्यक्रमों को सुलभ कराने वाली संस्थाओं की संख्या 1900 थी और ये 10 राज्यों और 5 संघीय क्षेत्रों में फैली हुई थीं।

1985-86 में व्यावसायिक पाठ्यक्रमों में कुल नामांकन 1,35,000 (कक्षा ग्यारह में 72,000 तथा बारह में 63,000) था। 1987-88 में, कार्यक्रम के प्रथम वर्ष में कुल नामांकन 1,20,000 है जो देश में उच्चतर माध्यमिक स्तर पर कुल दाखिले का 5 प्रतिशत है। +2 स्तर पर शिक्षा के व्यावसायीकरण को बढ़ावा देने के लिये, इन पाठ्यक्रमों के छात्रों के लिए विशिष्ट कुशलताओं में प्रशिक्षण, योजनाबद्ध शिक्षुता तथा लाभप्रद रोज़गार के सुलभीकरण जैसी सुविधाओं को जुटाने के लिए कदम उठाये गये हैं जो उन्हीं प्रयासों का हिस्सा हैं जो इस कार्यक्रम की उपयोगिता को बढ़ाने तथा इसे अधिक स्वीकार्य एवं सफल बनाने के लिये किये जा रहे हैं।

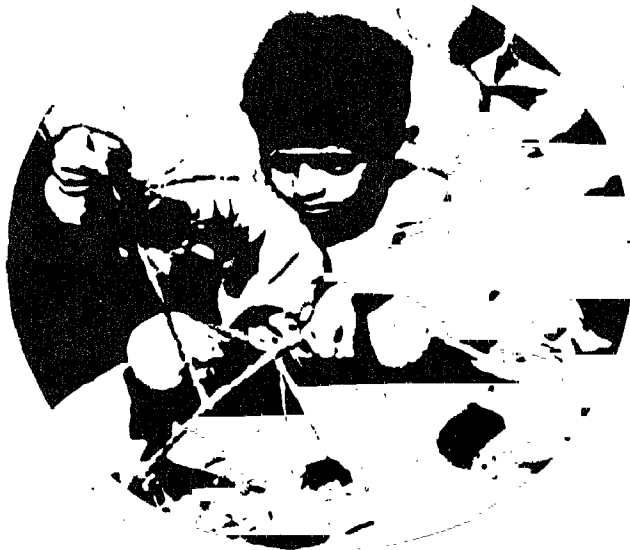
राष्ट्रीय शिक्षा नीति (1986) में परिकल्पना की गई है कि व्यावसायिक शिक्षा को सुव्यवस्थित, सुनियोजित तथा पूर्ण उत्साह के साथ क्रियान्वित किया जाएगा, जिसमें व्यक्तिगत रोज़गार क्षमता बढ़ेगी, कुशल मानव-संसाधनों की उपलब्धि तथा मांग में अन्तर कम होगा तथा उन छात्रों को एक वैकल्पिक पाठ्यक्रम के चयन की सुविधा प्राप्त होगी, जो बिना रुचि एवं उद्देश्य के, उच्चतर शिक्षा प्राप्त करने लगते हैं। व्यावसायिक शिक्षा में उद्यम कार्य तथा अपना रोजगार चलाने के लिए आवश्यक अभिरुचियों, ज्ञान तथा कुशलताओं को विकसित करने पर भी बल दिया गया है। यह प्रस्ताव भी किया गया है कि उच्चतर माध्यमिक शिक्षा के छात्रों में से 1990 तक 25 प्रतिशत तथा 1995 तक 50 प्रतिशत छात्रों के लिये व्यावसायिक पाठ्यक्रमों की व्यवस्था कर दी जाये। इस बात की व्यवस्था भी की गई है कि व्यावसायिक पाठ्यक्रमों के स्नातकों को व्यावसायिक विकास तथा पेशे में सुधार के अवसर जुटाये जाएं और उनके लिए ऐसे सेतु कोर्सों को उपलब्ध कराया जाये जिनके माध्यम से वे सामान्य तकनीकी तथा व्यावसायिक कोर्सों में पार्श्विक प्रवेश पा सकें।

शैक्षिक टैक्नालोजी का उपयोग

पिछले कुछ वर्षों में एक उल्लेखनीय बात यह हुई है कि स्कूल शिक्षा, शिक्षण-प्रशिक्षण, शिक्षा के व्यापक सुलभीकरण तथा देश के भिन्न क्षेत्रों तथा लोगों के भिन्न वर्गों में शैक्षिक असन्तुलन को कम करने के लिये, शैक्षिक टैक्नालोजी के साधनों का प्रयोग किया जाने लगा है।

शैक्षिक टैक्नालोजी की प्रगति के फलस्वरूप, शुरू में, देश के कई राज्यों में दृश्य-श्रव्य इकाइयां तथा फिल्म लाइब्रेरियां स्थापित की गईं। उस समय दृश्य-श्रव्य इकाइयों का मुख्य कार्य चार्टों, नक्शों, माडलों तथा अन्य शैक्षिक साधनों का उत्पादन एवं उपार्जन तथा तत्सम्बन्धी प्रशिक्षण देना था। फिल्म लाइब्रेरियां, स्कूलों में शैक्षिक फिल्मों तथा फिल्म-पट्टियों के प्रचार में लगी हुई थीं। शैक्षिक टैक्नालोजी ने, अधिगम विज्ञान तथा शिक्षण-प्रबन्ध के रूप में, छठे दशक के आरंभिक वर्षों में देश में पूर्व-योजित अध्ययन पद्धति के लागू होने के साथ, रचनात्मक दिशा में प्रगति की रा० शै० अनु० प० परिषद् ने पूर्व-योजित शिक्षण- सामग्री का प्रयोग करने में पहल की जिसकी

सहायता से प्रत्येक छात्र, अपनी अधिगम-क्षमता के अनुसार, अध्ययन द्वारा पूर्व-निश्चित शैक्षिक उद्देश्यों को प्राप्त कर सकता है। 1966 में स्थापित कार्यक्रमित अधिगम एवं शैक्षिक नवाचार के भारतीय संघ (Indian Association of Programmed Learning & Educational Innovations) ने, पूर्वयोजित शिक्षण सामग्री से सम्बन्धित शैक्षिक टैक्नालोजी का शिक्षा- शास्त्रियों में प्रचार करने में पथ-प्रदर्शक का कार्य किया।

शैक्षिक टैक्नालोजी में गुणात्मक सुधार तथा परिमाणात्मक विस्तार के उद्देश्य से, तत्कालीन शिक्षा तथा समाज कल्याण मंत्रालय ने पाँचवीं पंचवर्षीय योजना के दौरान, एक कार्यक्रम को शुरू किया। यह कार्यक्रम, दूरदर्शन सुविधाओं के विस्तार के संदर्भ में तैयार किया गया था और इसका उद्देश्य, शिक्षा की गुणात्मकता को सुधारने के लिये, दूरदर्शन तथा रेडियो जैसे शिक्षण माध्यमों के प्रयोग को प्रोत्साहित करना था। इस कार्यक्रम के अन्तर्गत 1975 में रा० शै० अनु० प्र० परिषद् में, राष्ट्रीय स्तर पर शैक्षिक प्रौद्योगिकी केन्द्र तथा उसके चार क्षेत्रीय शिक्षण कालेजों में शैक्षिक प्रौद्योगिकी एककों की स्थापना की गई। बाद में शैक्षिक प्रौद्योगिकी केन्द्र तथा परिषद् के शिक्षण साधनों के विभाग का विलय करके, शैक्षिक प्रौद्योगिकी संस्थान (शै० प्रौ० सं०) बना दिया गया। उन्हीं दिनों देश भर में शैक्षिक प्रौद्योगिकी सैल भी

स्थापित किये गए। कुछ राज्यों में शैक्षिक प्रौद्योगिकी सैलों में अतिरिक्त सुविधाओं तथा रेडियो एवं दूरदर्शन के शैक्षिक कार्यक्रमों के विकास के लिए अवस्थापना की व्यवस्था कर, उन्हें राज्य शैक्षिक प्रौद्योगिकी संस्थानों में परिवर्तित कर दिया गया। आशा है कि अन्य सैल भी इसी नीति का अनुकरण करेंगे।

राष्ट्रीय शिक्षा नीति (1986) में प्रारंभिक शिक्षा के स्तर को सुधारने तथा देश के दूरवर्ती क्षेत्रों में और समाज के पिछड़े हुए वर्गों के लिए, शिक्षा के व्यापक सुलभीकरण में, शैक्षिक टैक्नालोजी की महत्वपूर्ण भूमिका की परिकल्पना की गई है। उपग्रहों की उपलब्धि तथा देश में दूरदर्शन तथा रेडियो केन्द्रजाल के प्रयोग के लिए, उपग्रह टैक्नालोजी के विस्तार से सम्बद्ध जो योजनायें बनाई गई हैं, उन्होंने शिंक्षा में जन संचार माध्यमों के व्यापक प्रयोग के लिये नए मार्गों को प्रशस्त कर दिया है।

आल इंडिया रेडियो जिसे अब आकाशवाणी का नाम दिया गया है, ने स्कूलों के लिए कार्यक्रमों का प्रसारण 1932 में आरम्भ कर दिया था। अब देश में 44 केन्द्र हैं जो नियमित रूप से स्कूलों के लिये कार्यक्रम तैयार करते हैं जिन्हें इन केन्द्रों के अतिरिक्त 30 सहायक केन्द्रों से भी प्रसारित किया जाता है ताकि दूरवर्ती क्षेत्रों में अध्यापक तथा छात्र इन से लाभान्वित हो सकें। कुछ केन्द्र, विश्वविद्यालयों द्वारा संचालित पत्राचार पाठ्यक्रमों को परिपुष्ट करने के लिये कार्यक्रमों का प्रसारण करते हैं। स्कूलों के लिये प्रतिवर्ष सात हजार से अधिक कार्यक्रम प्रसारित किये जाते हैं। अधिकांश कार्यक्रमों को आकाशवाणी के केन्द्र स्वयं निर्मित करते हैं। कुछ शिक्षा संस्थाएँ, विशिष्ट श्रोताओं के लिए, सुनिश्चित शैक्षिक उद्देश्यों को ध्यान में रखकर, एक मुश्त (पैकेज)श्रव्य कार्यक्रम तैयार करने लगी हैं। इस संदर्भ में माध्यमिक तथा उच्च माध्यमिक स्तरों पर अंग्रेजी की शिक्षा देने के लिये केन्द्रीय अंग्रेजी तथा विदेशी भाषा संस्थान, हैदराबाद, ने तथा प्राथमिक स्तर पर हिन्दी को प्रथम भाषा के रूप में पढ़ाने के लिए, केन्द्रीय शैक्षिक प्रौद्योगिकी संस्थान ने पाठों को विकसित किया है। राजस्थान में अजमेर तथा जयपुर जिलों में किये गये सफल प्रयोगों के पश्चात, के० शै० प्रौ० सं० द्वारा विकसित कार्यक्रमों को होशंगाबाद जिले के 450 प्राथमिक स्कूलों में इस्तेमाल किया जायेगा जिन्हें 'टू-इन-वन' सैट दिये गए हैं।

रेडियो के विपरीत, दूरदर्शन को देश में, मुख्यतया, शैक्षिक उद्देश्यों की पूर्ति के उद्देश्य से, शुरू किया गया था। प्रथम प्रायोगिक दूरदर्शन सेवा का उद्घाटन 1959 में दिल्ली में किया गया, आरम्भ में सामाजिक शिक्षा के कार्यक्रमों की श्रृंखला प्रदर्शित की गई और 1961 में, माध्यमिक स्कूलों की पाठ्यचर्या पर आधारित कार्यक्रमों का प्रसारण शुरू हुआ। दिल्ली में लगभग 600 स्कूलों मे दूरदर्शन सैटों की व्यवस्था की गई। तत्पश्चात् तीन अन्य केन्द्रों, बम्बई, मद्रास तथा श्रीनगर में स्कूल स्तर के पाठ्यक्रमों पर आधारित कार्यक्रमों का निर्माण एवं प्रसारण होने लगा।

1975-76 में एक वर्ष तक चलने वाले "उपग्रह शैक्षणिक दूरदर्शन प्रयोग" (जिस में अमरीकन उपग्रह का इस्तेमाल किया गया था), के साथ, दूरवर्ती ग्राम्य क्षेत्रों में रहने वाली जनता के लिए व्यापक रूप से संचार माध्यमों पर आधारित शिक्षा-पद्धति का चलन शुरू हुआ। उपग्रह के कार्यक्रमों से 6 राज्यों के बीस जिलों में स्थित 2330 ग्रामों में बसी हुई 35 लाख ग्रामीण जनसंख्या लाभान्वित हुई। प्रातःकालीन प्रसारण, प्रारम्भिक शिक्षा के कार्यक्रमों की समृद्धि के लिए नियत किये गये थे।

उपग्रह प्रयोग की सफलता से उत्साहित होकर 1979 में एक ऐसी योजना को विकसित करने के लिए प्रारम्भिक कार्रवाई की गई जिसमें शैक्षिक उद्देश्यों की पूर्ति के लिए, दूरदर्शन की उन सभी सुविधाओं का लाभ उठाना था जिनकी 1982 में भारत के अपने उपग्रह के अन्तरिक्ष में भेजे जाने से प्राप्त होने की सम्भावना थी। इस समय प्रारम्भिक शिक्षा स्तर के बच्चों तथा अध्यापकों के लिये, शैक्षिक दूरदर्शन कार्यक्रम इन्सैट I बी के माध्यम से, प्रतिदिन लगभग 4 घण्टों के लिए प्रसारित किया जाता है जिन्हें '6 राज्यों में' 5 प्रादेशिक भाषाओं में सुना जा सकता है। ये कार्यक्रम केन्द्रीय तथा राज्य शैक्षिक प्रौद्योगिकी केन्द्रों द्वारा तैयार किये जाते हैं। इन राज्यों में, विशेषकर ग्राम्य प्रारम्भिक स्कूलों के लिए, 4500 से अधिक सामूहिक सैटों की व्यवस्था की गई है। 1984 से लेकर शैक्षिक दूरदर्शन कार्यक्रम, इन्सैट की सहायता से 6 राज्यों में तथा उनका हिन्दी रूपान्तरण, 5 अतिरिक्त राज्यों और एक संघीय क्षेत्र में, सभी दूरदर्शन प्रेषकों द्वारा प्रसारित किया जाता है। अभिग्राही सैटों की कमी को दूर करने के लिये, सरकार ने प्राथमिक स्कूलों के लिये,

90,000 अतिरिक्त टी.वी. सैट तथा वर्तमान योजना के शेष वर्षों में सभी प्राथमिक स्कूलों में 'टू-इन-वन' सैट उपलब्ध कराने के लिये आवश्यक कदम उठाये हैं।

1986 से लेकर, स्कूल अध्यापकों के समूह-अभिस्थापन के राष्ट्रीय कार्यक्रम के अन्तर्गत, शैक्षिक दूरदर्शन कार्यक्रम प्रसारित किये जा रहे हैं। प्रत्येक वर्ष लगभग 5 लाख अध्यापकों तथा शिक्षा से सम्बद्ध अन्य कर्मचारियों को इस योजना से लाभ हुआ है।

इन्सैट I C तथा नवें दशक के प्रारम्भिक वर्षों में प्रस्तावित दूसरी पीढ़ी के उपग्रहों (इन्सैट II) के अन्तरिक्ष में स्थापित किये जाने के फलस्वरूप, दूरदर्शन की संवर्धित क्षमताओं की सहायता से, इस माध्यम का, राष्ट्र के उन वर्गों की शिक्षा के लिए व्यापक प्रयोग किया जाएगा जो अभी तक इसकी पहुंच से वंचित रहे हैं। हाल ही के वर्षों में, जो महत्त्वपूर्ण घटना घटी है, वह है स्कूलों में संगणक शिक्षा का संचालन। अब तक 640 माध्यमिक स्कूलों में, संगणक साक्षरता तथा अध्ययन की व्यवस्था की जा चुकी है। यह कार्यक्रम 53 संसाधन केन्द्रों की सहायता से कार्यान्वित किया जा रहा है। क्लास (कम्प्यूटर लिटरेसी एण्ड स्टडीज इन स्कूल्स) नामक परियोजना के अन्तर्गत, छात्रों को संगणकों तथा उनके प्रयोग के सम्बन्ध में आवश्यक जानकारी दी जाती है ताकि संगणक उनके लिए रहस्यमय यन्त्र न बना रहे तथा उन्हें इसके प्रयोगों की विविधता एवं अध्ययन-अध्यापन के साधन के रूप में इसकी क्षमता से अवगत कराया जा सके।

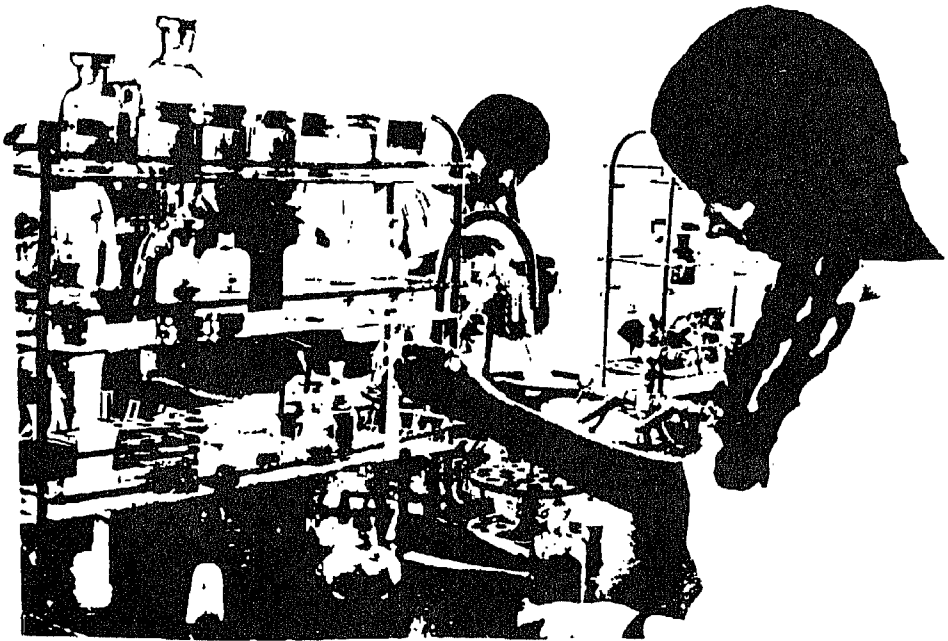
गुणात्मक विकास की समस्याएं

स्वतंत्रता-प्राप्ति के प्रथम दो दशकों में शैक्षिक सुविधाओं के विस्तार को उच्च प्राथमिकता दी गई थी। इससे स्कूल-शिक्षा के गुणात्मक सुधार के कार्यक्रम को सफल बनाने में कुछ बाधा पड़ी। आर्थिक विषम स्थिति के कारण, गुणात्मक सुधार के लिए, पर्याप्त वित्त की व्यवस्था न की जा सकी। कुछ अच्छे स्कूलों की संख्या में बढ़ोतरी अवश्य हुई तथा कुछ स्कूलों के स्तर को सुधारा भी गया, किन्तु शिक्षा के लिए बढ़ती हुई मांग को पूरा करने के लिए, कई घटिया दर्जे के स्कूल भी स्थापित किये गये। आजादी के शीघ्र बाद ही स्कूल स्तर पर शिक्षा की गुणवत्ता को सुधारने के लिए, सुव्यवस्थित कार्यक्रमों के विकास की

आवश्यकता को महसूस किया गया था। प्राथमिक शिक्षा को सुधारने के लिए जरूरी था कि पाठ्यचर्या के विकास तथा नवीकरण पर बल दिया जाये। अतः सभी विषयों में पाठ्यक्रमों को उन्नत करने एवं विषयों में अधिक विविधता लाने तथा उन्हें आधुनिक जानकारी से समृद्ध बनाने के प्रयास किये गए। उसके साथ-साथ पाठ्य पुस्तकों तथा अध्ययन-अध्यापन सामग्री को भी सभी पहलुओं से सुधारा गया ताकि उन्हें उन्नत पाठ्य-वस्तु एवं उच्च स्तरीय शिक्षण के अनुरूप बनाया जा सके।

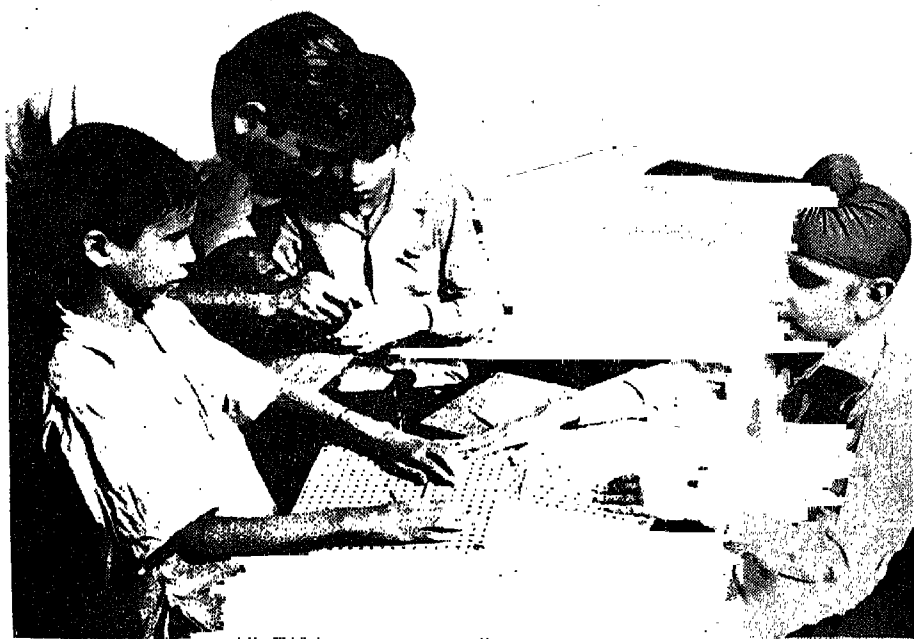
स्कूल शिक्षा को गुणात्मक बनाने के लिये, आजादी के तुरन्त बाद कई केन्द्रीय संस्थान स्थापित किये गए। उनमें केन्द्रीय शिक्षा संस्थान (1947), केन्द्रीय पाठ्य पुस्तक अनुसंधान ब्यूरो (1954), केन्द्रीय शैक्षिक और मार्गदर्शन ब्यूरो (1954), अखिल भारतीय माध्यमिक शिक्षा बोर्ड (1955), माध्यमिक शिक्षा विस्तार कार्यक्रम निदेशालय (1955-59), राष्ट्रीय बुनियादी शिक्षा संस्थान (1956), राष्ट्रीय मूल शिक्षा केन्द्र (1956) तथा राष्ट्रीय श्रव्य-दृश्य शिक्षा संस्थान प्रमुख माने जाते हैं।

सितम्बर, 1961 में एक स्वायत्त संगठन के रूप में राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद् की स्थापना की गई तथा इन सभी केन्द्रीय संस्थाओं का उसमें विलय कर दिया गया। इस परिषद् को, स्कूल शिक्षा के गुणात्मक सुधार के लिए निर्मित नीतियों के क्रियान्वयन तथा उसी सम्बन्ध में कार्यक्रमों एवं नवीन प्रक्रियाओं को विकसित करने में केन्द्रीय और राज्य सरकारों की सहायता एवं मार्गदर्शन के लिये स्थापित किया था। तब से स्कूल शिक्षा के गुणात्मक विकास के लिये किये गये प्रयासों में इस परिषद् की देन महत्त्वपूर्ण रही है। परिषद् के मुख्य उत्तरदायित्वों में अनुसंधान, विकास, प्रशिक्षण तथा विस्तार कार्य सम्मिलित हैं। स्कूल शिक्षा के लिए, पाठ्यक्रमों का विकास तथा पाठ्यपुस्तकों की रचना, इसकी प्रमुख क्रियाओं में से हैं।

परिषद् ने शिक्षकों के लिए दर्शिकाएँ तथा छात्रों के लिए पाठ्य पुस्तकें एवं अनुपूरक पाठ्य सामग्री तैयार की हैं। उसने अनुसंधान विनिबन्ध तथा कई पत्रिकाएं भी प्रकाशित की हैं। परिषद्, स्कूली बच्चों के लिए शिक्षण साधनों, विज्ञान किटों, प्रयोगशालाओं के लिये उपकरणों, शैक्षणिक फिल्मों तथा दूरदर्शन एवं रेडियो के लिए शैक्षिक कार्यक्रमों को तैयार करने में संलग्न रही है। प्रयोगवाद के साथ-साथ

इसने पाठ्यक्रम विकास, शिक्षण प्रक्रिया एवं परीक्षा पद्धति से सम्बद्ध शिक्षण-विधियों तथा नवीकरण की ओर विशेष ध्यान दिया है। देश में स्कूल शिक्षा तथा शिक्षक-प्रशिक्षण में गुणात्मक सुधार, परिषद् के ध्यान के मुख्य केन्द्र रहे हैं।

स्कूलों में पाठ्यक्रमों का नवीकरण

राष्ट्रीय शिक्षा नीति (1968) के लागू होने के साथ, स्कूल शिक्षा में गुणवत्ता के सुधार से सम्बद्ध कार्यक्रम का क्रियान्विति का नया युग प्रारम्भ हुआ। शिक्षा के स्तर को ऊँचा उठाने के लिये जो प्रयास किये गए, उनमें अधिक बल स्कूल पाठ्यक्रम के विकास तथा नवीकरण पर दिया गया। 1973 में केन्द्रीय शिक्षा तथा सामाजिक कल्याण मंत्रालय ने, स्कूल पाठ्यचर्या का ढांचा तैयार करने के लिए, विशेषज्ञों की एक समिति की नियुक्ति की। समिति ने तत्कालीन शिक्षा विधियों का गहन अध्ययन किया तथा देश में प्रारम्भिक एवं माध्यमिक शिक्षा के लिए पाठ्यक्रम के विकास के लिये एक ढांचे का प्रस्ताव किया। इसी ढांचे को कार्यरूप देने के लिए रा०शै०अनु०प्र०प० ने 1975 में दस वर्षीय स्कूल के लिए पाठ्य विवरण की एक रूपरेखा प्रस्तुत की।

इस रूपरेखा में, स्वीकार्य सिद्धान्तों तथा मूल्यों की परिधि के अन्तर्गत, पाठ्यक्रम के लचीलेपन पर बल दिया गया था ताकि उसे, यथा समय, वैज्ञानिक एवं तकनीकी शिक्षा की शीघ्रता से विस्तृत होती सीमाओं तथा देश में सामाजिक एवं आर्थिक परिस्थितियों के अनुरूप बनाया जा सके। बच्चों को आधुनिक ज्ञान से अवगत कराने, उनकी जिज्ञासा को प्रोत्साहित करने, अन्वेषण की वैज्ञानिक विधि को सिखाने तथा उनके मन में राष्ट्रीय दृष्टिकोण एवं वैज्ञानिक मन:स्थिति को बिठाने के उद्देश्य से, इस रूपरेखा में, विज्ञान तथा गणित को दसवीं कक्षा तक स्कूल शिक्षा का अभिन्न अंग बनाने की परिकल्पना की गई है। स्कूल शिक्षा के सभी स्तरों पर शिक्षा-प्राप्ति के साधन के रूप में, कार्य-अनुभव पर भी बल दिया गया है। ऐसे पाठ्यक्रम को विकसित करने की आवश्यकता पर भी जोर दिया गया है जो सामाजिक चेतना को उभारने, लोकतांत्रिक मूल्यों को विकसित करने तथा सामाजिक न्याय की भावना एवं राष्ट्रीय समन्वय को प्रोत्साहित करने में सहायता दे सके।.

''दस वर्षीय स्कूल के लिए पाठ्यक्रम—एक रूपरेखा'' के आधार पर विकसित पाठ्यचर्या तथा पाठ्य पुस्तकों समेत पठन-पाठन की योजनाओं तथा उद्देश्यों के मूल्यांकन तथा पुनः परीक्षण के लिए, जून 1977 में, एक पुनरीक्षण समिति नियुक्त की गई थी।

स्कूल शिक्षा के उद्देश्यों तथा विषय-वस्तु का पुनरावलोकन कर, समिति ने, स्कूल शिक्षा के भिन्न स्तरों पर पढ़ाए गए विषय-क्षेत्रों की संरचना, पाठ्य-विवरण के ढांचे तथा उनके समय-निर्धारण के सम्बन्ध में कुछ सिफारिशें कीं। समिति ने सुझाव दिया कि शैक्षिक उपलब्धियों की तुलनीयता तथा अतिरिक्त कुशलताओं एवं ज्ञान की प्राप्ति के उद्देश्य से पाठ्यक्रम में मूल विषय-वस्तु के 'कोर' की व्यवस्था करते समय, इस बात का ध्यान रखना चाहिए कि वह स्थानीय परिस्थितियों के अनुरूप हो। समिति ने यह सिफारिश भी की कि स्कूल शिक्षा के सभी स्तरों पर समाजोपयोगी उत्पादक कार्य को प्रमुख स्थान दिया जाये तथा पाठ्य विषयों का यथासम्भव, उससे सम्बन्ध जोड़ा जाये। समिति का मत था कि किसी भी विषय के लिये निर्धारित पाठ्य सामग्री सामान्यतया सबके लिए एक समान होनी चाहिये किन्तु उसमें इतना लचीलापन अवश्य हो कि स्कूल शिक्षा के बोर्ड, उसका ब्योरे का विवरण अपनी आवश्यकताओं के अनुसार तैयार कर सकें। समिति ने निर्धारित विषयों की सूची में से एक ऐच्छिक विषय के अध्ययन की सिफारिश भी की ताकि छात्र अपनी विशिष्ट अभिरुचियों तथा प्रतिभाओं को विकसित कर सकें। समिति ने माध्यमिक स्तर पर विज्ञान तथा गणित में भिन्न स्तरों के शिक्षण अनुक्रमों का प्रस्ताव किया किन्तु बाद में इसे रद्द कर दिया गया।

देश में राज्यों तथा संघीय क्षेत्रों में स्कूलों के लिये जो पाठ्यक्रम विकसित किये गये थे, वे ''दस वर्षीय स्कूल के लिए पाठ्यक्रम—एक रूपरेखा'' तथा दस वर्षीय स्कूलों के पाठ्यक्रमों के पुनरीक्षण के लिए स्थापित समिति की रिपोर्ट पर आधारित थे। किन्तु उनके क्रियान्वयन की मात्रा में सन्तुलन स्थापित नहीं किया जा सका। उसका एक कारण यह था कि पाठ्यक्रम में सुझाये गए परिवर्तनों को अध्यापन एवं अध्ययन की प्रक्रियाओं, शिक्षक प्रशिक्षण तथा परीक्षाओं में सुधार से सम्बद्ध करने के लिए कोई व्यापक योजना नहीं थी। स्कूलों में पाठ्यक्रम को प्रभावी ढंग से लागू करने के लिए आवश्यक भौतिक एवं मानव संसाधन

सब स्थानों पर एक समान उपलब्ध नहीं थे। कक्षाओं में पाठ्यचर्या के वास्तविक अनुकरण तथा पाठ्यक्रम के परिकल्पित उद्देश्यों में विषमता के परिणामस्वरूप, छात्रों की उपलब्धियों के स्तर तथा देश के भिन्न भागों में स्थित स्कूलों की शिक्षा के स्तर में व्यापक अन्तर आ गया।

1983 में रा०शै०अ० और प्रशिक्षण परिषद् ने एक कार्यकारी ग्रुप का गठन किया जिसका कार्य भिन्न राज्यों तथा संघीय क्षेत्रों में प्रवर्तमान पाठ्यक्रमों की शीघ्रता से जांच करना तथा शैक्षणिक भार की दृष्टि से उनका मूल्यांकन करना था। 1984 में प्रकाशित इस कार्यकारी ग्रुप की रिपोर्ट, "**स्कूल स्तर पर पाठ्यक्रम भार–एक आशु मूल्यांकन**", में समस्या के स्वरूप की व्याख्या की गई तथा पाठ्यक्रम- भार के अवबोध के मूल कारणों का पता लगाया गया। रिपोर्ट ने स्पष्ट किया कि पाठ्यक्रम के भार की समस्या के लिए उसका विकास इतना उत्तरदायी नहीं था जितना उसका प्रबन्ध तथा उसके सम्बन्ध में प्रत्यक्ष ज्ञान जिनकी जटिलता साधनों की कमी के कारण और बढ़ गई थी। आवश्यक भौतिक सुविधाओं तथा शैक्षणिक निवेशों की कमी, शिक्षा शास्त्रीय नवीन प्रक्रियाएं निम्न-कोटि की अध्यापन-सामग्री, अध्यापकों की तैयारी और अभिस्थापन में कमी, सार्वजनिक परीक्षाओं का प्रभुत्व–ये सभी तत्व विद्यार्थी को अध्ययन के आनन्द से वंचित रखने के लिये उत्तरदायी समझे गए थे।

पाठ्यक्रम के मूल्यांकन सम्बन्धी रिपोर्ट पर अनुवर्ती कार्रवाई के सन्दर्भ में रा.शै.अनु.प्र. परिषद् ने एक संचालन ग्रुप का गठन किया जिसे उभरती समस्याओं तथा अवश्यकरणीय विषयों को ध्यान में रख कर, प्राथमिक तथा माध्यमिक शिक्षा के लिए एक राष्ट्रीय पाठ्यक्रम के ढांचे को विकसित करने का कार्य सौंपा गया।

इस ग्रुप द्वारा निर्दिष्ट पाठ्यक्रम सम्बन्धी समस्याओं एवं विषयों पर, 1985 में सम्पादित एक राष्ट्रीय तथा चार प्रादेशिक सेमिनारों में विचार-विनिमय किया गया। इन सेमिनारों में दिये गए सुझावों और सिफारिशों के आधार पर, रा०शै०अनु०प्र० परिषद् ने जनवरी, 1986 में, प्राथमिक तथा माध्यमिक शिक्षा के लिए एक राष्ट्रीय पाठ्यक्रम ढांचा प्रस्तुत किया, जिसे बाद में, राष्ट्रीय शिक्षा नीति 1986 के महत्त्वपूर्ण सुझावों और प्राथमिकताओं के संदर्भ में संशोधित कर, अप्रैल, 1988 में प्रकाशित कर दिया गया। परिषद् ने, राष्ट्रीय पाठ्यक्रम के ढांचे में

संकेतित पाठ्यक्रम के भिन्न क्षेत्रों के लिए पाठ्यचर्या के लिए मार्गदर्शी रूपरेखाएं तथा पाठ्य-विवरण तैयार किये हैं।

राष्ट्रीय पाठ्यक्रम के ढांचे के आधार पर विकसित पाठ्य चर्या के अनुसार, निर्मित पाठ्य-पुस्तकों सहित, संशोधित शैक्षणिक पैकेज भी विकसित किये गए हैं और उन्हें केन्द्रीय विद्यालयों तथा माध्यमिक शिक्षा के केन्द्रीय बोर्ड से सम्बद्ध अन्य स्कूलों में क्रमिक कार्यक्रम के अनुसार क्रियान्वित किया जा रहा है। राज्यों तथा संघीय क्षेत्रों ने रा.शै.अनु.प्र. परिषद् द्वारा विकसित पाठ्यक्रम तथा शैक्षणिक पैकेजों के आधार पर अपनी पाठ्यचर्याओं और शैक्षणिक पैकेजों को संशोधित करके, उन्हें अपने स्कूलों में लागू करना शुरू कर दिया है।

विज्ञान शिक्षा

स्वतंत्रता-प्राप्ति के बाद, स्कूलों में विज्ञान के शिक्षण को सुधारने के लिए महत्त्वपूर्ण प्रयास किए गए हैं। माध्यमिक शिक्षा आयोग (1952-53) ने स्कूल-स्तर पर विज्ञान तथा गणित के अध्यापन को सुदृढ़ बनाने की सिफारिश की थी। इसने सुझाव दिया था कि माध्यमिक स्तर पर विज्ञान के कुछ सामान्य पक्षों की शिक्षा दी जाये तथा उच्चतर माध्यमिक स्तर पर भौतिकी, रसायन, जीवविज्ञान तथा गणित को वैकल्पिक विषयों के रूप में पढ़ाया जाये। इसी सुझाव के क्रियान्वयन के फ़लस्वरूप, विज्ञान को वैकल्पिक विषय के रूप में अधिक से अधिक स्कूलों में तथा सामान्य विज्ञान को सभी माध्यमिक स्कूलों में पढ़ाने की सुविधाओं को उपलब्ध कराने के प्रयास किये गए थे।

शिक्षा आयोग (1964-66) की रिपोर्ट मिलने पर, विज्ञान की शिक्षा को सुधारने के लिए क्रमबद्ध प्रयास किये गए। स्कूल शिक्षा के पुनर्गठन की चर्चा करते हुए, आयोग ने स्कूलों में विज्ञान तथा गणित के शिक्षण के स्तर को ऊंचा उठाने की आवश्यकता पर बल दिया था। स्कूलों में विज्ञान के अध्ययन-अध्यापन को सुधारने के लिए कई प्रायोजनाएं क्रियान्वित की गईं। रा.शै.अनु.प्र. परिषद् द्वारा क्रियान्वित विज्ञान शिक्षा कार्यक्रम के अन्तर्गत, इस दिशा में एक महत्त्वपूर्ण प्रयास किया गया। प्राथमिक तथा माध्यमिक स्कूलों में विज्ञान के अध्यापन के पुनर्गठन एवं विस्तार के लिए 1969 में विज्ञान शिक्षा बोर्ड की स्थापना की गई। 1975 तक, देश में प्रायः सभी राज्यों और संघीय क्षेत्रों ने

स्कूलों में इस कार्यक्रम को लागू कर दिया था। विज्ञान के पाठ्य विवरण का नवीकरण, शिक्षण साधनों का विकास एवं प्रयोग, अध्यापकों का सेवाकालीन प्रशिक्षण तथा प्राथमिक और माध्यमिक स्तर पर विज्ञान के अध्यापन के लिए पर्यावरण तथा स्थानीय संसाधनों का प्रयोग, इस कार्यक्रम में सम्मिलित थे। इसके साथ ही, उच्च तथा उच्चतर माध्यमिक स्तरों पर विज्ञान तथा गणित के पाठ्यक्रमों को सुधारने के लिए प्रायोजनाओं को शुरू किया गया। इन प्रायोजनाओं में आधुनिकी-कृत पाठ्यक्रमों, क्रिया तथा प्रयोग पर आधारित पाठ्य-पुस्तकों, अध्यापकों के लिये गाइडों, प्रयोगशालाओं के लिये नियम पुस्तिकाओं, विज्ञान किटों, फिल्म एवं फिल्म-पट्टियों तथा अन्य शिक्षण साधनों से सम्बद्ध व्यापक शिक्षण पैकेजों के कार्यक्रम सम्मिलित थे। रा.शै.अनु.प्र. परिषद् ने, विज्ञान के अध्यापकों को, विज्ञान की विभिन्न शाखाओं में हुई प्रगति तथा विज्ञान के अध्यापन में नवीनतम तकनीकों से अवगत कराने के लिए, ग्रीष्म-कालीन प्रशिक्षण कार्यक्रमों को भी आयोजित किया। परिषद् ने राज्य शिक्षा संस्थानों, राज्य शैक्षिक अनुसंधान और प्रशिक्षण परिषदों तथा राज्य विज्ञान शिक्षा संस्थानों जैसे संगठनों के प्रमुख कुशल व्यक्तियों के लिये, राष्ट्रीय/प्रादेशिक/राज्य स्तरों पर, कई प्रशिक्षण कार्यक्रमों का संचालन किया। परिषद् ने, नवीन विचारों एवं प्रगतियों को प्रसारित करने के लिए तथा विज्ञान के शिक्षकों तथा प्रशिक्षकों को विचार-विनिमय के लिये एक मंच जुटाने के लिये, ''**स्कूल साइंस**'' नाम की पत्रिका का प्रकाशन आरम्भ किया। विज्ञान को सर्वप्रिय बनाने के लिये, बच्चों के लिये 'राष्ट्रीय विज्ञान प्रदर्शनी' की योजना समारम्भ की गई। विज्ञान तथा गणित में प्रतिभाशाली छात्रों की खोज तथा पी.एच.डी. स्तर तक उनके अध्ययन काल में, प्रतिभा को परिपोषित करने के उद्देश्य से ''विज्ञान प्रतिभा खोज'' की एक योजना संचालित की गई।

राष्ट्रीय शिक्षा नीति (1986) में विज्ञान शिक्षा को सुदृढ़ बनाने की परिकल्पना की गई है ताकि बच्चों में, जिज्ञासा, सृजनात्मकता, वस्तुनिष्ठता, शंका-निवारण के लिये प्रश्न पूछने का साहस तथा सौन्दर्य-संवेदना जैसी सुनिश्चित क्षमताओं एवं मूल्यों को विकसित किया जा सके। स्कूलों में विज्ञान शिक्षा को सुधारने के प्रयासों के अन्तर्गत, एक केन्द्रीय योजना शुरू की गई है। इस योजना में, सभी उच्चतर माध्यमिक स्कूलों

को विज्ञान किट्स देने; माध्यमिक तथा उच्चतर माध्यमिक स्कूलों में विज्ञान प्रयोगशालाओं को दृढ़ बनाने तथा उनके स्तर को सुधारने; माध्यमिक तथा उच्चतर माध्यमिक स्कूलों में पुस्तकालयों के स्तर को ऊँचा उठाने; स्कूल शिक्षा के सभी स्तरों पर अध्यापकों को सेवाकालीन प्रशिक्षण देने; शिक्षकों को प्रशिक्षण देने तथा शिक्षण सामग्री का विकास करने के लिए जिला संसाधन केन्द्रों को स्थापित करने; तथा विज्ञान शिक्षा के क्षेत्र में नवाचारी प्रायोजनाओं को चलाने तथा विज्ञान के विकास के लिए अन्य क्रियाकलापों को शुरू करने के लिए स्वायत्त संगठनों को वित्तीय सहायता देने की व्यवस्था है।

परीक्षाओं में सुधार

स्कूल स्तर पर शिक्षा की गुणवत्ता को सुधारने के लिये जो प्रयास किये गये, परीक्षाओं में सुधार उन्हीं में से एक है। विद्यार्थियों के कार्य-निष्पादन का मूल्यांकन करने के लिये परीक्षा पद्धति तथा अन्य प्रक्रियाओं एवं तकनीकों में सुधार करने के लिये कई कदम उठाये गए। परीक्षा-सुधार के लिये जो कार्रवाई की गई, उसमें शैक्षिक मूल्यांकन, अनुसंधान तथा विकासात्मक कार्यक्रमों के लिये नवीन उपागम तथा एक नई नीति शामिल थे जिसका उद्देश्य सार्वजनिक परीक्षाओं, मूल्यांकन प्रक्रियाओं एवं तकनीकों के विकास में संलग्न अध्यापकों एवं अन्य प्रमुख व्यक्तियों के प्रशिक्षण में सुधार करना था। भिन्न विषय-क्षेत्रों में प्रश्न-बैंकों तथा यूनिट-टैस्टों के रूप में मूल्यांकन-सामग्री के नमूने तैयार करना, व्यापक सतत् मूल्यांकन के लिये योजनाएं बनाना तथा खुली पुस्तकों की सहायता से परीक्षाएं, मौखिक परीक्षाओं एवं परिणामों की घोषणा के लिये श्रेणीकरण जैसी वैकल्पिक मूल्यांकन प्रक्रियाओं की योजनाओं को विकसित करना, इसी कार्रवाई का हिस्सा थे। इन्हीं गतिविधियों के फलस्वरूप, कई माध्यमिक तथा उच्चतर माध्यमिक शिक्षा-बोर्डों ने प्रश्न-पत्रों के डिजाइन, मूल्यांकन की प्रक्रियाओं तथा परीक्षा-संचालन तकनीकों में महत्वपूर्ण सुधार किये हैं।

शिक्षक प्रशिक्षण

स्वतन्त्रता-प्राप्ति के बाद अध्यापकों की संख्या में महत्वपूर्ण वृद्धि

हुई है। प्राथमिक स्कूलों के अध्यापकों की संख्या 1950-51 में 5.38 लाख से बढ़ कर 1985-86 में 15.22 लाख हो गई। माध्यमिक स्तर पर अध्यापकों की संख्या 1950-51 में ·86 लाख से बढ़कर 1985-86 में 9.79 लाख हो गई। इसी अवधि में उच्चतर माध्यमिक कक्षाओं के अध्यापकों की संख्या 1.27 लाख से बढ़कर 11.99 लाख हो गई।

भारत के स्वाधीन होने के बाद से सेवा-पूर्व तथा सेवारत अध्यापकों की योग्यता में वृद्धि करने के उद्देश्य से कई कार्यक्रम शुरू किये गए जिनमें सेवारत अध्यापकों के लिये पत्राचार एवं सम्पर्क कोर्सों की व्यवस्था, तथा अप्रशिक्षित अध्यापकों की मान्यता-प्राप्त शिक्षा संस्थाओं में पूर्णकालिक, संस्थागत प्रशिक्षण के लिए प्रतिनियुक्ति प्रमुख हैं। इन कार्यक्रमों से, प्राथमिक तथा माध्यमिक स्कूलों में अप्रशिक्षित तथा कम प्रशिक्षित शिक्षकों की संख्या में कमी करने में काफी सहायता मिली।

गत वर्षों में प्रशिक्षित अध्यापकों की संख्या नियमित रूप से बढ़ती रही है। प्राथमिक स्कूलों में प्रशिक्षित अध्यापकों की प्रतिशतता 1950–51 में 58.8 से बढ़कर 1986-87 में 87.26 हो गई। माध्यमिक स्कूलों में यह प्रतिशतता 1950–51 में 53.3 से बढ़कर 1986-87 में 89.64 हो गई।

प्राथमिक तथा माध्यमिक स्कूलों के अध्यापकों के लिए सेवाकालीन प्रशिक्षण कोर्सों को संगठित करने में कई संगठन तथा एजेंसियां लगी हुई हैं। राष्ट्रीय स्तर पर, रा. शै. अनु. प्र. परि. ने सेवाकालीन अध्यापकों के प्रशिक्षण में लगे प्रमुख प्रशिक्षकों तथा विशिष्ट व्यक्तियों के लिए प्रशिक्षण कोर्स संगठित किये। प्रादेशिक स्तर पर, परिषद् द्वारा संचालित क्षेत्रीय शिक्षा कालेज भी, राज्यों/संघीय क्षेत्रों के प्रमुख तथा उपाय कुशल व्यक्तियों के लिए प्रशिक्षण कोर्सों का संचालन करते हैं। वे प्रादेशिक स्तर पर अथवा किसी राज्य की विशिष्ट मांग पर प्रशिक्षण कोर्स संगठित करते हैं। राज्य/संघीय क्षेत्र के स्तर पर, राज्य शैक्षणिक अनुसंधान तथा प्रशिक्षण परिषदें/राज्य शिक्षा संस्थान, सेवारत अध्यापकों के लिए अल्प-कालिक प्रशिक्षण कोर्स आयोजित करते हैं।

सेवा-पूर्व तथा सेवारत अध्यापकों के प्रशिक्षण के लिए एक उपयुक्त तंत्र को विकसित करने के लिये प्रयास किये जा रहे हैं। राष्ट्रीय शिक्षा नीति, 1986 में अध्यापक प्रशिक्षण को देश की परिवर्तित होती आवश्यकताओं के अनुरूप बनाने के लिये, उसे ओवरहाल करने

की परिकल्पना की गई है। अतः शिक्षकों की शिक्षा को पुनः संरचित तथा संगठित करने के कार्य की ओर विशेष ध्यान दिया गया है। शिक्षक-शिक्षण को सुधारने के प्रयासों के अन्तर्गत, उसके पुनर्गठन तथा पुर्नसंरचना के लिए एक केन्द्रीय योजना शुरू की गई है। इस योजना में जिन कार्यकलापों की परिकल्पना की गई है, वे हैं– 1990 तक प्रतिवर्ष लगभग 5,00,000 अध्यापकों का अनुस्थापन ताकि नई नीति के क्रियान्वयन के लिए, उन्हें प्रेरणा एवं सक्षमता प्रदान की जा सकें; लगभग 400 जिला शिक्षा तथा प्रशिक्षण संस्थाओं की स्थापना; लगभग 250 माध्यमिक शिक्षक शिक्षा संस्थानों का गठन करना तथा उनमें से 50 को शिक्षा के उच्च अध्ययन संस्थानों के रूप में विकसित करना; राज्य शैक्षिक अनुसंधान तथा प्रशिक्षण परिषदों को सुदृढ़ बनाना; और विश्वविद्यालयों में शिक्षा विभागों की स्थापना तथा उन्हें सुदृढ़ बनाना।

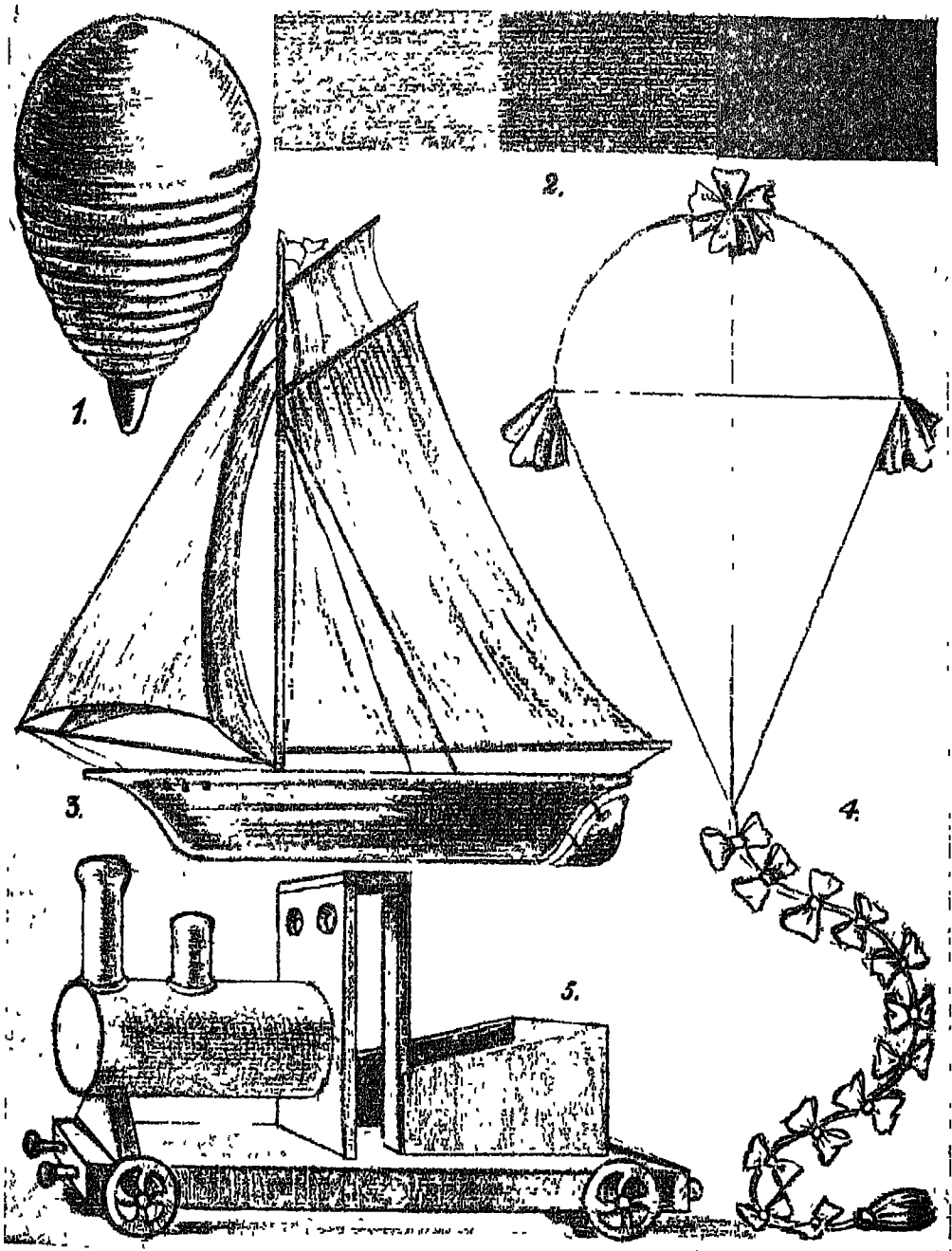
व्यापक अनुस्थापन कार्यक्रम के अन्तर्गत, 1986-87 तथा 1987-88 में क्रमशः4.42 तथा 4.55 लाख स्कूल अध्यापकों को अनुस्थापित किया गया है। सातवीं योजना अवधि के शेष वर्षों में यह कार्यक्रम जारी रहेगा। प्रत्येक वर्ष लगभग 5 लाख अध्यापकों को अनुस्थापित करने का लक्ष्य निर्धारित किया गया है।

शैक्षिक विकास में वर्तमान प्राथमिकताएं

राष्ट्रीय शिक्षा नीति, 1986 में भावी वर्षों में स्कूल शिक्षा के क्षेत्र में अपेक्षित प्रमुख उपक्रमणों तथा प्राथमिकताओं का उल्लेख है। वे इस प्रकार हैं:

1. अनूसूचित जातियों, अनुसूचित जनजातियों, शैक्षिक दृष्टि से पिछड़े हुए अल्पसंख्यकों तथा शारीरिक एवं मानसिक रूप से अक्षम व्यक्तियों की विशिष्ट आवश्यकताओं की पूर्ति द्वारा, विषमताओं का निराकरण तथा शैक्षिक अवसरों का समीकरण।
2. शिक्षा को, सामाजिक रूपान्तरण एवं राष्ट्रीय विकास के लिए प्रमुख माध्यम तथा सामाजिक, सांस्कृतिक, नैतिक मूल्यों और भारतीय संविधान में प्रतिष्ठापित मूल्यों के पोषण के लिए

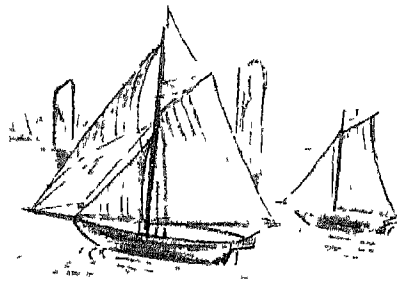
शक्तिशाली सा॰
प्रक्रिया का अन ापन।

3. स्कूलों को सुधारने के लिये, एक दीर्घ-कालिक राष्ट्रव्यापी कार्यक्रम जिसे प्रगति-मूलक स्कूलों की स्थापना से बल एवं प्रोत्साहन मिलेगा। ये स्कूल, शिक्षा के गुणात्मक सुधार के कार्यक्रम के लिए उत्प्रेरक की भूमिका निभाने की चेष्टा करेंगे।
4. व्यक्तिगत रोजगार-क्षमता को बढ़ाने, कुशल मानव-शक्ति की माँग तथा उपलब्धि में असन्तुलन को कम करने, तथा बिना विशेष रुचि अथवा प्रयोजन के उच्च-शिक्षा प्राप्त करने में संलग्न युवकों के लिए एक विकल्प जुटाने के लिए, शिक्षा का व्यावसायीकरण।
5. जन संचार के माध्यमों के प्रयोग द्वारा सर्व-साधारण के लिए शिक्षा का अधिक सुलभीकरण तथा खुली एवं सतत् शिक्षा पद्धति के लिए संस्थाओं की स्थापना।
6. शिक्षक शिक्षा को स्कूल पाठ्यक्रम की बदलती मांगों के अनुकूल बनाने के लिए, उसके पुनः कल्पन (ओवरहाल) के साथ-साथ ऐसी परिस्थितियों को पैदा करना जो अध्यापकों को रचनात्मक तथा सृजनात्मक दृष्टिकोण अपनाने के लिये प्रेरित एवं अनुप्राणित करें।
7. शिक्षा के आयोजन तथा प्रबन्ध की पद्धति का पुनः कल्पन, जिसके लिए शिक्षा का दीर्घकालीन आयोजन तथा प्रबन्ध के परिपेक्ष्य को विकसित करना और देश के विकास तथा जन-संसाधनों की आवश्यकताओं के साथ उसका समाकलन करना आवश्यक होगा; शैक्षिक संस्थाओं का विकेन्द्रीकरण तथा उनमें स्वायत्तता की भावना का उत्पादन; तथा शैक्षिक कार्यों के आयोजन एवं क्रियान्वयन में गैर-सरकारी एजेंसियों और स्वैच्छिक संगठनों सहित लोगों के सक्रिय योगदान की व्यवस्था।

COLOUR SHAPES—PASTEL

1 Pegtop 2 Colour Grading 3 Yacht 4 Kite 5 Toy Engine

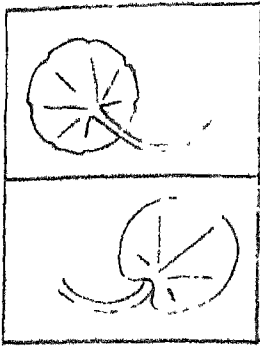
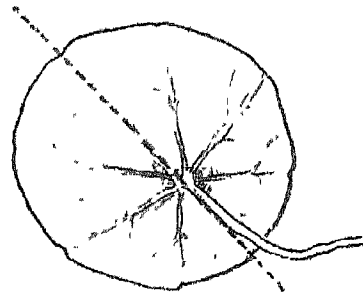
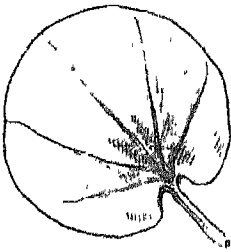
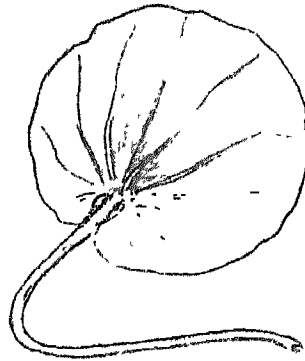
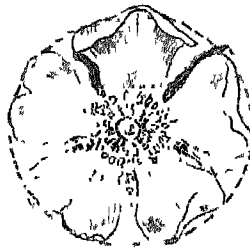
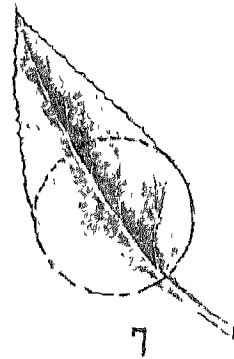
copy, and the children can complete their exercise. As opportunity arises similar exercises in red and blue can be carried out on the same paper.

Exercise 2.—On the same paper the children will find pleasure in attempting to represent a toy yacht, Fig 3 A simple charcoal outline of the shape of the hull with the bowsprit, and an upright line for the mast will be sufficient help to the general shape. A few questions on the relative length of the boat and the mast will secure fair proportion. Supervise these early stages, as the importance of the process of first planning a drawing needs to be constantly urged The children will thus begin to realise what are the main lines that compose every object. When this is accomplished a great difficulty in object drawing has been overcome It is wise to make the initial plan the fundamental of each effort in objective drawing. The practice is followed by the greatest artists. The children can now apply their colour to the hull, remembering their grading exercise. The sails will afford an interesting talk on shapes, and can be added afterwards. Ropes can be lightly placed in by the children, who will also enjoy giving the yacht a pet name which they can print on its bow

Coloured tops, kites, toy engines or similar playthings create keen interest in colour work, and should be utilised frequently, Figs. 1, 4, and 5

Toy Yachts

VII. DRAWING FROM NATURE—PENCIL

Introduction.—Provide the children with single leaves of the nasturtium and coltsfoot, and let them divide the page in halves by a level line. Now they will place their leaves on the opposite page, Fig 1. The nasturtium leaf should lie with the stem upwards. Encourage the children to place the leaves in an interesting fashion, and to draw them in this position. Now recall the pencil lessons on round objects with "rays" from the centre.

Exercise 1.—*Nasturtium leaf* Let the children place a circle, lightly drawn, in a position on their paper corresponding to that of the leaf Test their observation by a few questions on the position of the centre of the rays on the leaf. The children will perceive that the junction of the rays lies on a line which passes through the centre of the leaf, but it is not actually at the centre (Fig. 2), and they will now mark its position by making a point on their circle. From this point they can draw the seven rays towards the circle, as seen on the leaf What do they notice on the edge of the leaf where the rays point? (Breaks in the curve.) They will draw these in the

DRAWING FROM NATURE—PENCIL

1 Grouping on Paper 2 Nasturtium Leaf 3 Coltsfoot Leaf 4 Lily Leaf 5 Violet Leaf 6 Wild Rose Flower 7 Lilac Leaf.

same position on their circle, making the line neat and even. Now from the centre of the rays draw the stem.

Exercise 2.—*Leaf of coltsfoot.* Let the children discover differences by asking them a few simple questions. The centre of the rays will be found near the outside of the circle, Fig 3 Place the leaf in position as before, and look for its fanlike rays Draw these on the circle. Where does the stem join the leaf? Draw the stem.

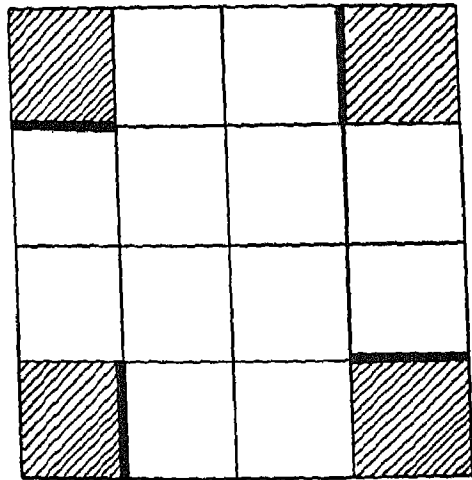
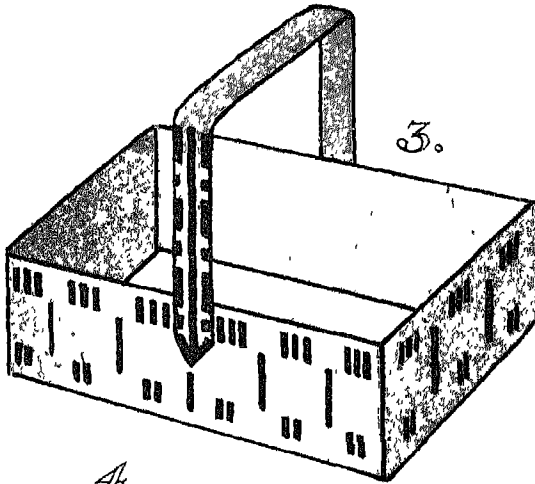
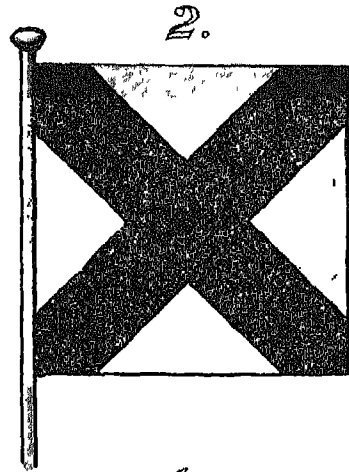
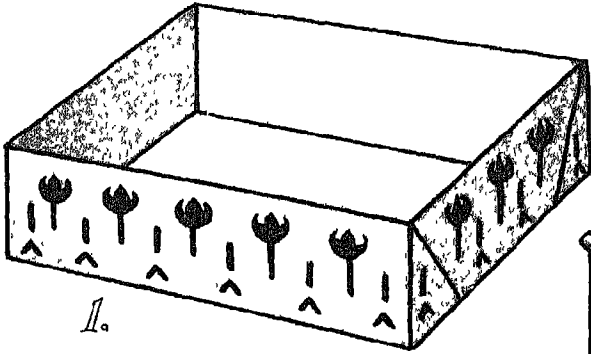
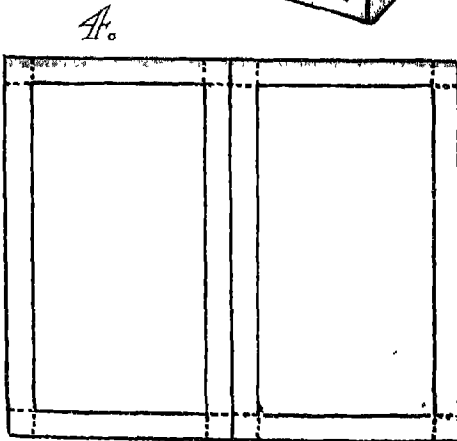
The leaves of the pond lily and violet are useful supplementary exercises.

VIII. HANDWORK—BOX SHAPES

Exercise 1.—Proceed by investigation to find out the method of construction of a pin tray made of paper. Release the corners and show the simple folds which make the sides of the tray. Flatten these out and exhibit a square of paper. Let the children take a 5 in. square of paper and mark ½ in. from each corner Join the points by lines parallel to the edge of the paper, and fold it with the ruler edge. Fold the corner square across its diagonal, tuck in the double triangle formed along the side and fasten it cleanly with gum. Square the corners This little model can be effectively decorated with cut-outs of coloured paper, Fig 1.

Another example for the decorative arrangement of the simple square is a flag, Fig. 2. The 5 in. square should be marked off in inch spaces round its sides. By joining the first divisions from each corner diagonally to those in the opposite corners, the cross of St Andrew is suggested. The actual cross should be coloured with blue gummed paper and the square fastened to a strip of wood for a staff.

PLAN OF A BASKET

Exercise 2.—A 6 in. square of tinted paper will be used to construct a basket. Let the children divide each side of the square into four equal parts and join the opposite points, making sixteen small squares. An actual model should now be developed to indicate how the construction is carried out. Cuts are made between squares 3 and 4 on each side, working round from the top to the right. Fold the square at each corner inwards, and fold upwards the two remaining squares on each side. With gum or Croid fasten the corner squares neatly on the inside of the basket A strip of paper 5 in. long and ¾ in. wide, folded 1½ in from each end, will represent the handle. This will be carefully fastened in the middle of the sides using ½ in. for the fixture, Fig. 3.

Exercise 3.—To make the picture frame, Fig 4, let each child measure and cut a piece of paper 8 in. square and fold it carefully down the middle. Mark ½ in. from each corner and on each side of the middle fold.

HANDWORK—BOX SHAPES

1 Pin Tray 2 Flag 3 Basket 4 Picture Holder 4a. Picture inserted in Holder

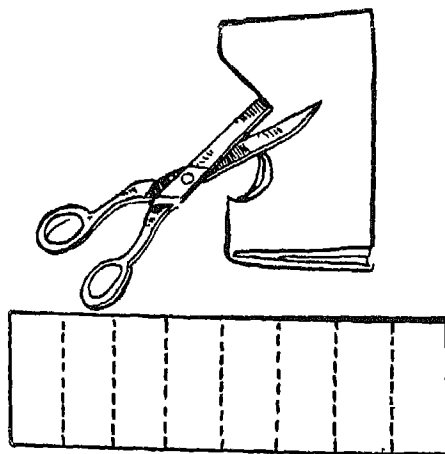
Join these points by lines parallel to the edges The meeting of these lines will form the corners of an inside oblong Fold the left oblong in halves carefully so that the edges fit exactly, and cut along the pencilled lines; in this way the inside oblong is cut out. Now gum the skeleton shape lightly along the outside edge of the left-hand top and bottom sides This will leave the right-hand side open for the insertion of a picture or a calendar If the picture is wide instead of long, the frame will be turned round and a short side left open The frame can be tinted with a light wash of colour and a pattern placed upon it Such hand-made frames are useful for exhibiting drawings and patterns, and can be made to any convenient size by the same method, Figs 4, and 4a

IX. COLOUR SHAPES—PASTEL

(Colour Plate No 162 C in the portfolio)

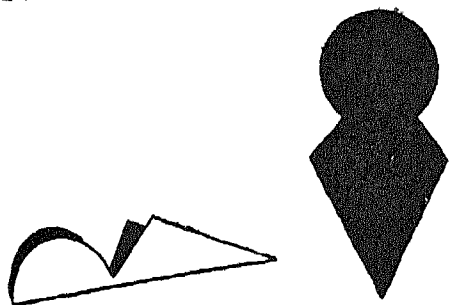
Introduction.—Prepare the drawing of a large yellow circle on a red background Pin this to the blackboard well above the eye level of the children Provide pastels, charcoal and pastel paper.

Exercise 1.—Memory drawing—"shut eye" method Ask the children to point their charcoal at the edge of the yellow disc on the blackboard. They must keep their eyes on the point of the charcoal, and trace the shape of the disc in the air. Now let them repeat the motion with eyes closed, mind and hand working together. Then, with their eyes shut, require the children to make a drawing of the circle. Collect the papers, which will be an interesting study for the teacher, and remove the blackboard copy On fresh papers ask the children to draw the circle with their eyes open. Permit them to practise the slow swing of the shape before putting charcoal to paper. It may then be very lightly drawn

Exercise 2.—Replace the square and the disc, and ask the children to draw lightly in charcoal an upright line on each side of the circle, 1 in from the ring, both lines to be of equal length Now they may draw two level lines, 1 in. above and 1 in below the circle. Join the ends of all the lines The shapes are now complete, Fig 1 Let the children proceed by applying yellow pastel (first grade) to the circle (as in Lesson 5), and afterwards red pastel to the surround, covering the outline and keeping all the edges clean and tidy.

FOLDING AND CUTTING A PAPER SHAPE

Exercise 3.—Paper cuts and pattern making. In connection with the pastel lesson, the teacher will create interest and pleasure by a few exercises such as are detailed here.

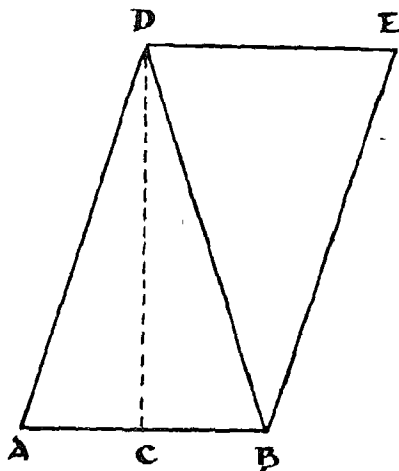
Supply each child with a slip of paper about 8 in long and 3 in wide, and a pair of scissors. Ask the children to fold their papers once, keeping the edges close together.

Now fold them again and yet again. The folded paper is now 1 in wide Ask the children to hold their papers with the open ends at the left side, then to place them down, and with their charcoal sketch one half of a shape they have learnt, or, if they prefer to do so, two such shapes touching each other Now with their scissors they can cut round the charcoal line. The pieces cut out should be unfolded and placed on the desk before them

PAPER SHAPES

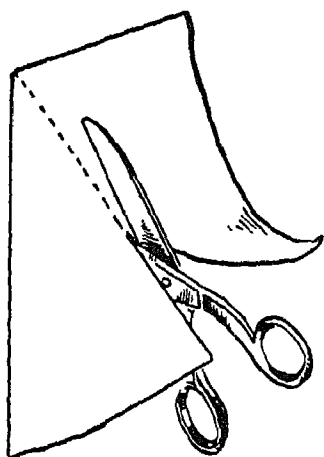
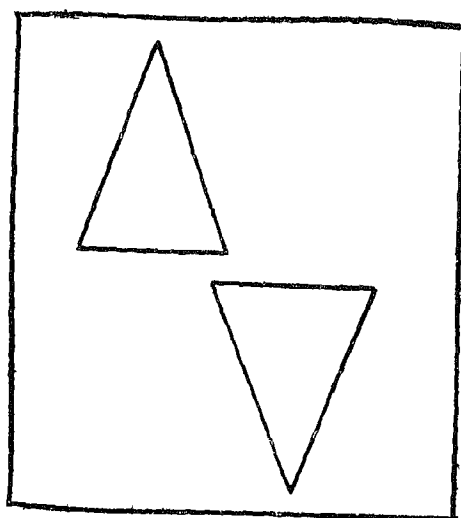
These shapes will interest the children They can now unfold the strips of paper and place them flat upon the tinted pastel papers They see their shapes again with renewed interest. Now instruct the children to press the paper closely down and fill in the cut-outs with red pastel After removing the slip of paper they will see that the result is a row of shapes, Fig 2 Ask the children how the cut-out slip may otherwise be used The children may now be left to arrange their shapes to decorate the border of their paper, or by the use of an alternative colour, to devise patterns of their own, Fig 3.

Exercise 4.—For girls, simple line designs can be made with one or two colours for the purpose of decorating sewing bags, cuffs and collars The simplest tacking or button-hole stitches can be used as units. Suggest the orderly arrangement and grouping of the pattern. A light charcoal line should be ruled about ½ in from the top edge of the paper, and another, the width of the ruler, drawn below These lines can be marked off in spaces 2 in. long and the pattern arranged nicely in these spaces and between the lines, Fig 4 All lines at this stage should be horizontal or vertical. This exercise may be usefully applied in the needlework lesson, Figs 4, 5, 6, 7.

X. DRAWING FROM NATURE—PENCIL

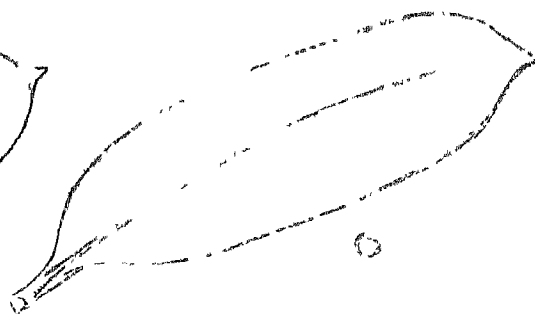
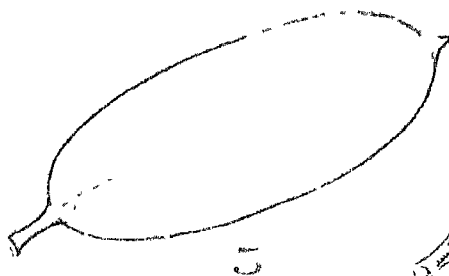
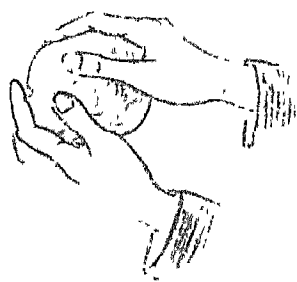
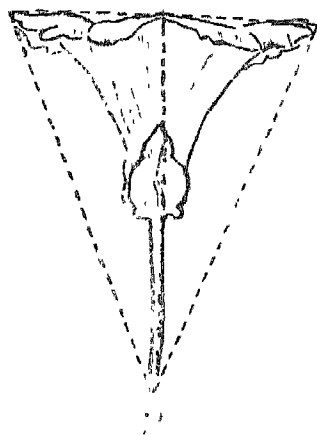
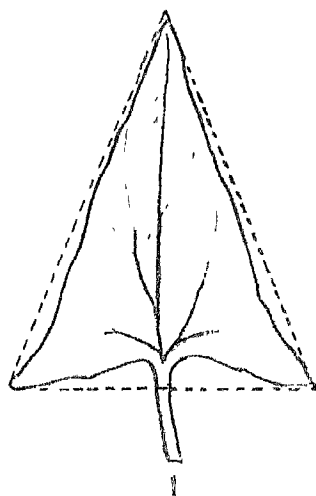
Preparatory handwork.—Paper, ruler and scissors are required Let the children draw a level line AB, 3 in long, near the bottom of the paper. Halve the line and from its centre draw an upright line CD, 4 in long. Join AD and BD From D draw another level line DE, 3 in long, to the right. Join BE. Now cut along the line DB. We have two models of a new shape—the triangle Place these in position on the left side of the book, as in the previous lesson. Now use the shapes as a guide, and draw two triangles in the positions chosen, on the right-hand page of the book.

DRAWING A TRIANGLE

Exercise 1.—Distribute some leaves of the convolvulus, and pin a large one against white paper on the blackboard. Let the children lightly press the leaf on to the paper triangle, to impress on their minds the sense of its shape. They will notice that the lower sides of the leaf curve from the shape Now ask them to look at their shape and draw these slightly curved lines. Where does the curve join? At the centre of the level line, but inside the shape. Let them mark the position of the join and draw curves from the corners to that point Now they can draw the stem. An upright line from the stem to the point of the leaf will complete the drawing of this leaf shape, Fig 1, Plate VIII.

Exercise 2.—A new leaf shape can be placed in the second triangle, or if the triangle be inverted the convolvulus flower may be used, as seen in Fig. 2, Plate VIII

Cutting a Triangle

Placing Triangles for Drawing

XI. DRAWING FROM NATURE—CLAY AND PENCIL

Introduction.—Our efforts to train perception have mainly been directed by our aim to stimulate sense impressions through the channel of sight We must now realise that these efforts will be greatly aided by further stimulation through the sense of touch In this way fresh knowledge will be received The educational advantage of paper folding and modelling has already been utilised, and it is now suggested that modelling in clay should be practised The drawing of natural forms is greatly assisted by preparatory modelling in clay, which conveys through the hands to the brain the beauty and strength of line, the sense of mass and of form With these senses already awakened by a preparatory modelling exercise, and the eye perceiving what the hands

PLATE VIII

DRAWING FROM NATURE—CLAY AND PENCIL

1 Convolvulus Leaf 2 Convolvulus Flower 3 Modelling Shape 4 Development of Model 5 Completed Shape 6 Laurel Leaf

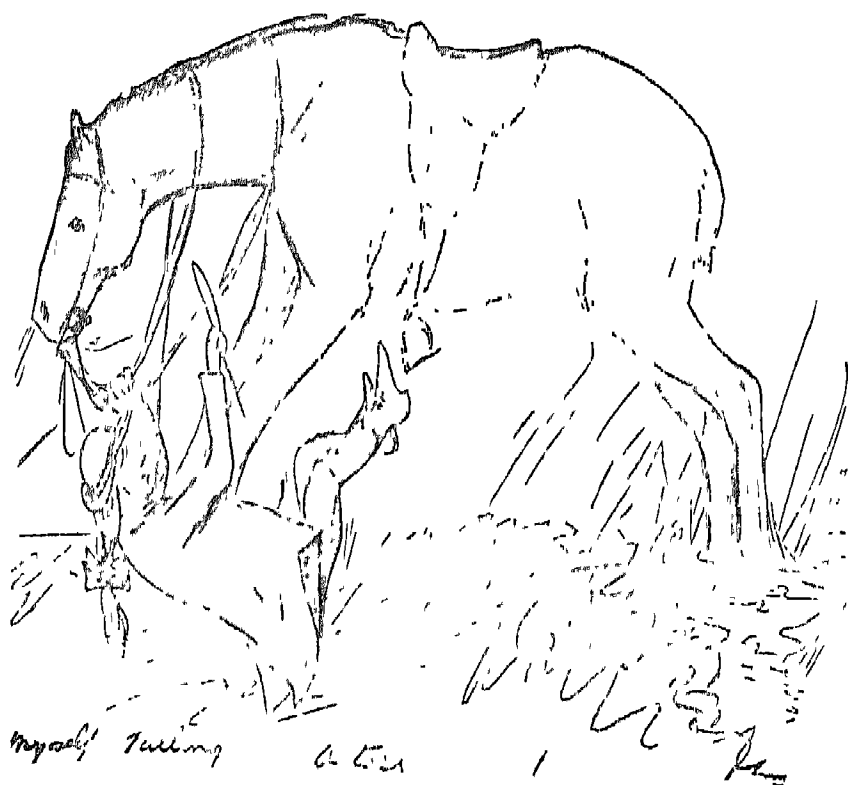
have felt, the power to express these graphically will become almost instinctive in the normal child Modelling in clay will give surprising assistance to those whose efforts have been hampered by faulty perceptions

Preparatory handwork.—Provide each child with a lump of clay, pointed sticks and a laurel leaf. Let the children roll the clay between the hands into a ball as shown in the illustration Now with their thumbs and forefingers they can press the ball flatly into an oval shape, continuing to thin the mass down to the shape of the leaf. With a trimming stick they can smooth and shape the edges, having first run their fingers round the actual leaf. Similarly they can point the end of the shape forming the tip of the leaf. From the spare clay let them prepare a short stem, having first felt the one belonging to their specimen. With a pointing stick they can now trace the midrib and place the stem in line with it. Now ask the children to trace the forefinger slowly round the shape from stem to point and from point to stem.

Exercise 1.—The clay model having been removed, the children will now draw in their books the leaf as it lies beside them, preferably on the opposite page What is the first thing to consider? The direction of the leaf This is shown by the line through it. Let them draw that first. Now what is its general shape? The children will scarcely need to be reminded of the model or the tracing they made round it They can next draw a long oval round their line. The general shape is now complete Small curves suggested by their trimming exercise can indicate the tip of the leaf, and the stem will be placed in line with the midrib. Simple leaf forms of the apple, plum, bay, etc, can be used for further exercises on these lines.

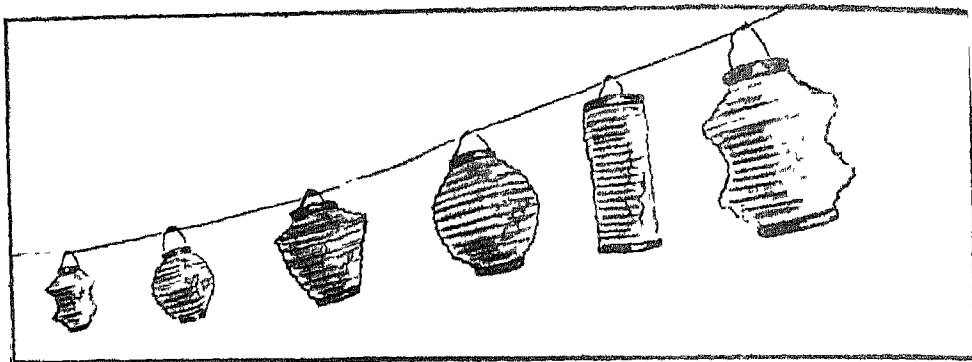
XII. IMAGINATIVE DRAWING—PENCIL

Introduction.—Children have the instinctive desire to express themselves graphically; it is this instinct which enables them to draw what they cannot express so well in words The teacher should make full use of this effective aid to the stimulation of the imagination, for without it mental training is seriously hindered in its development. The faculty of imagination exercises other mental processes without over-stimulation, and gives a new interest to all effort. The drawing lesson supplies opportunities for the cultivation of this faculty to a rare degree, and it is important and necessary to permit the power of imagination to influence all that the children do, not only at this stage but throughout the entire course The lesson which follows is intended to serve as a graphic illustration of what is passing through the minds of the children after they have heard a simple story.

Exercise.—For this first lesson a few simple elements can be grouped together to make a pictorial story. For example· a cat is on the ground playing with a ball; in the sky the sun is shining; a big tree stands beside a pond on which a duck is swimming Allow the children to put down these ideas graphically. The truthfulness of the drawing is not our concern so much as the value of the imaginative effort. Without making any comments, allow the children to complete their efforts Teachers will have no difficulty in suggesting other ideas for the children to represent by drawing Frequently the children themselves will indicate what they would like to draw.

(Reproduced by courtesy of the Royal Drawing Society

"Snapshot Drawing" of herself, visualised by A H St John, age 11

XIII. BRUSHWORK—PATTERN MAKING

(Colour Plate No. 161 A in the portfolio)

Introduction.—It is necessary to explore the ground previously covered by the children in brushwork before proceeding to the actual training suggested in this course. What facility have the children acquired hitherto in the use of the brush? What do they know of the selection of colours? The purpose of this first lesson should be to discover these important facts. The materials needed are as follows. tubes containing primary colours (light red, chrome yellow, cobalt, white and lamp black) which should be supplied *to* the children and not *by* them (if preferred the teacher may distribute the colours from large tubes on to palettes or saucers), small jars for the water; good brushes (No. 5), and a small piece of rag. As an alternative, the usual boxes of water colours may be supplied, but the advantages in colour training obtained by the use of body colour cannot be over-estimated. The usual cartridge paper of good weight found in drawing books will be suitable for use in brushwork exercises.

These earlier lessons should be free from formal teaching and technical explanations. The children should be permitted to experiment and enjoy the colour effects they can produce Some instruction on the proper use of the brush, however, will be necessary at the outset. The children should be told to keep the brush in a fairly upright position, to work with the point, never pressing the hairs down and working on the stub, and to use their cleaning rag when making a change of colour or completing their exercise. Even the brush becomes a better tool with the use of body colour, as by its use the hairs do not spread.

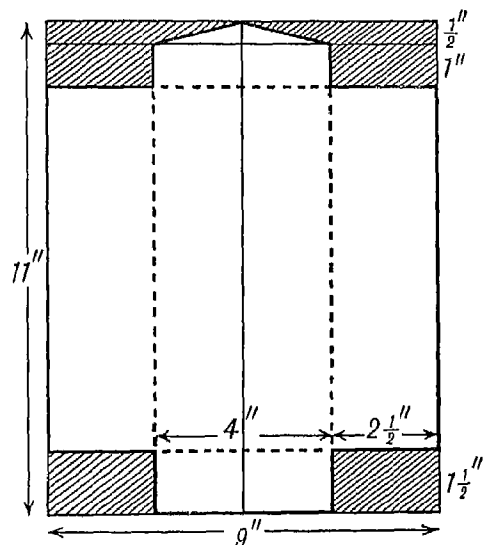
It is suggested that no object should be placed for them to draw, but that they should attempt to colour something of an indefinite shape so that the mental effort is reduced to a minimum

Exercise 1.—Tell the children that they are going to make a colour representation of a Chinese lantern Each child has a dab of the selected colours on a saucer or a small palette From these they will decide which to select for this exercise. With their brushes they can make a moist patch on their paper with clean water, roughly the shape of a lantern. The surface should be about 3 in. long. They can now take up a little paint

on their brushes and make a red patch in the centre of their shape, and with the free use of water spread it to the outside, gradually building up the shape they desire to make. Having done this, the children should now rinse and dry their brushes, wiping them from holder to point with a rag They will now take up a little blue and with horizontal bands of colour indicate the top and bottom hoops of the lantern A thin curve will represent the wire holder. The children's perception will not be satisfied by this representation of a lantern, and they will wish to add more to complete their mental image Permit them to experiment and find pleasure in their adventures with colour. with white and black they may endeavour to suggest lighter tints and darker tones, and lines of contour Many copies will be untidy and unskilful, but the mental stimulus given will repay any disappointment of this kind Colour washes will be poor, colour grading will be absent while technical faults will be numerous, but the sheer joy of the children in producing their mental picture of a lantern will provide the teacher with good reasons for the lesson which will follow The general results at this stage form the basis of the teacher's knowledge of the children's attainments.

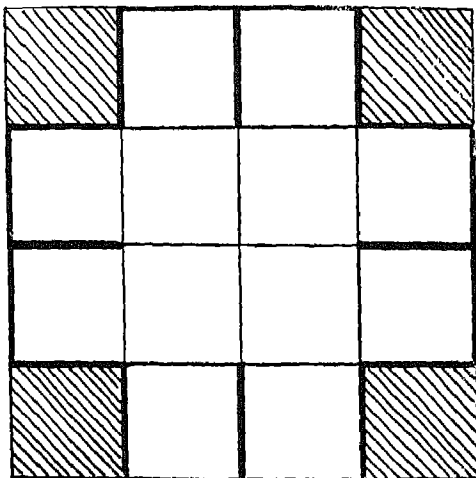
Exercise 2. *Oral.*—For a first lesson in actual colour selection and colour matching, the teacher should be supplied with a set of coloured papers in reds. In conjunction with these, red objects should be displayed—ribbon, red books and daubs of red ink and red paint upon white paper The children should be invited to indicate which coloured paper they would select to match either the ribbon, the book or the daubs of colour. Questions as to reasons why certain reds have not been chosen will indicate their powers of discrimination.

XIV. HANDWORK—ENVELOPES

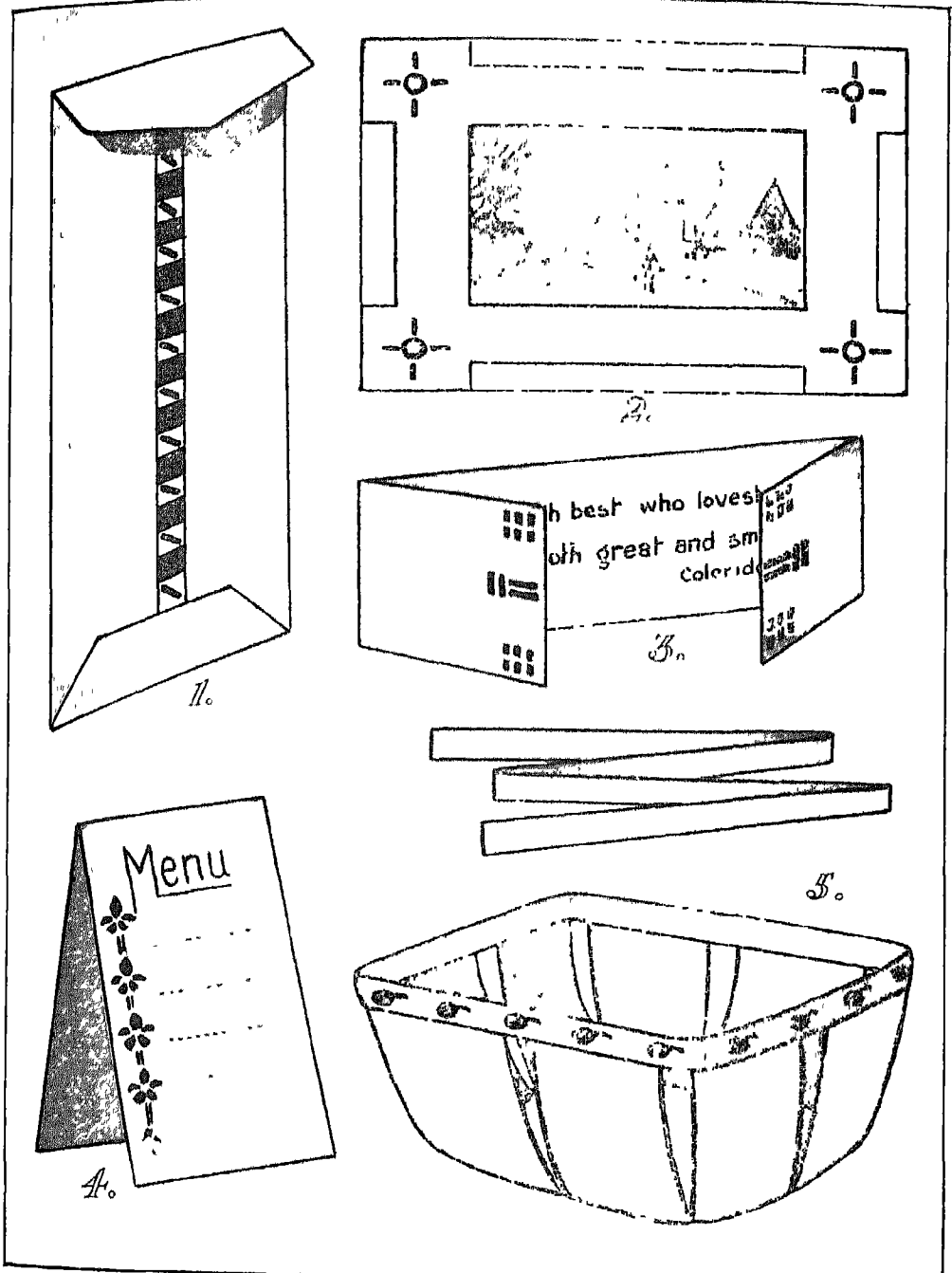
Exercise 1.—Provide a large foolscap envelope which will be gradually opened out before the children so that they can analyse the method of construction Pin the opened envelope to the blackboard and the children will discover the shape of the paper required to make a similar envelope For the present it can be considered to be made of a large square with oblongs added to the top and bottom This can be indicated on the blackboard by drawing lines enclosing the whole. Let the children measure the size of the paper required for the length and breadth. A 9 in. square with oblongs of 1 in depth added to the top and bottom is necessary, therefore the paper required must be 11 in long and 9 in broad. As the model lies evenly in this shape draw a line through the middle This line, called an axis, is important in most model making, as the chief points generally lie evenly on

PLAN OF A FOOLSCAP ENVELOPE

either side of it. Having drawn the shape and its axis, mark 2 in on each side of the centre at both the top and bottom, and join the points. From the top pair of points place a mark ½ in down on the lines made Place points at distances 1½ in from the top on the outside lines On the cross line 1½ in. from the bottom, place points where it is crossed by the folding lines (dotted) which are 2½ in. from the outside edges. By observing the teacher's large model, the children can draw clean lines showing its outline. This having been done, the model can be cut out

Take down the envelope and show the method of folding, which the children must carefully observe. Folding should be made neat and square by using the edge of the ruler, and creases should be rubbed down with the side of a penknife or the thumb nail. Folding surfaces should now be cleanly fastened with Gloy or Croid, the left side over the right, and the bottom flap fastened across them, Fig 1. Further exercises on flat shapes developed from squares and oblongs can be dealt with in the same way. A simple scheme of decoration should be added where the object lends itself to pattern This can be done with pastel or gummed paper cut-outs Thus envelopes of differing shapes (evolved by the children), block letters, polygons, trays, frames, etc, will provide ample practice, Figs 2, 3, and 4.

Exercise 2 —A simple method of constructing a punnet is illustrated in the diagram given A large square is divided into sixteen smaller squares and cuts are made along the heavy lines The four middle squares form the bottom, and the shape is secured by folding upwards the middle squares at the sides With a long strip of paper these are bound into position The completed model can be made very attractive by decoration, Fig 5 By cutting and folding similar plans, the children will discover many interesting constructions and gain facility in manipulation.

PLAN OF A PUNNET

XV. SQUARE AND OBLONG SHAPES—PENCIL

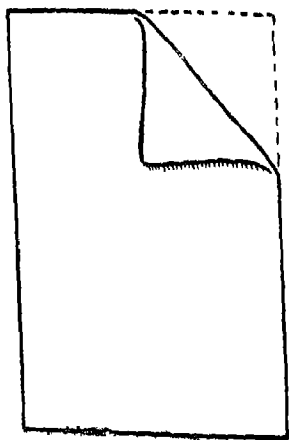
Introduction.—Though the square and oblong suggest mechanical drawing, they also form the general shape of many familiar objects. On being asked a few questions the children will supply quite a long list For a first lesson on these familiar shapes, the children can use their rulers and draw lightly on their books a 4 in. square, and an oblong 4 in long and 3 in. broad. With the aid of the blackboard, let the class explain the main features of these shapes—their upright and level lines, their angles, their parallel sides, etc. Ask the children to point out similar shapes in the room—window panes, the front and side of the table, a panel in the cupboard, etc By this

HANDWORK—ENVELOPES, ETC

1 Envelope 2 Framed Picture 3 Decorated Greeting Folder 4 Menu 5 Punnet

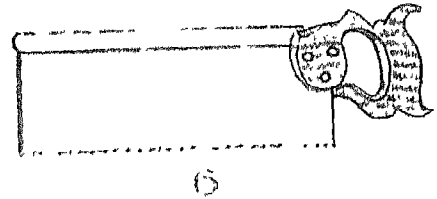
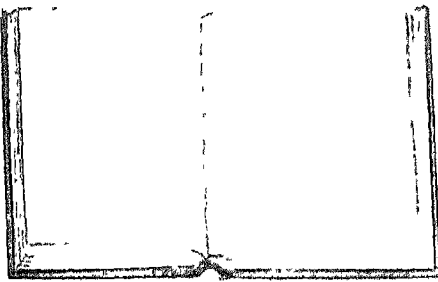
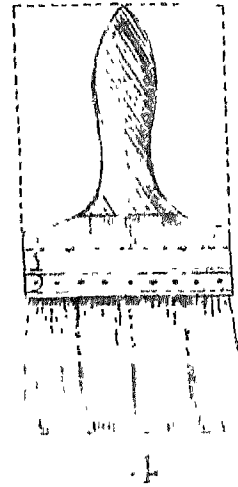
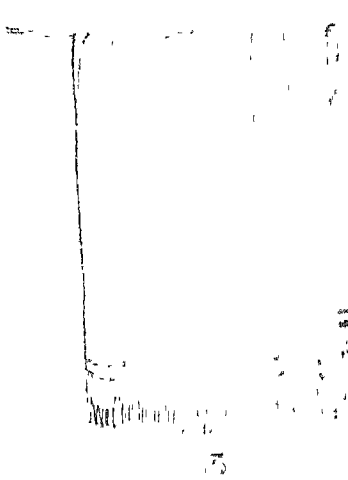
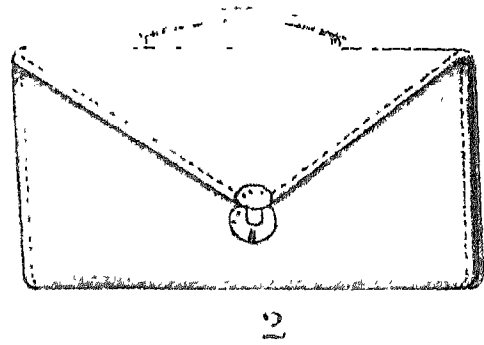
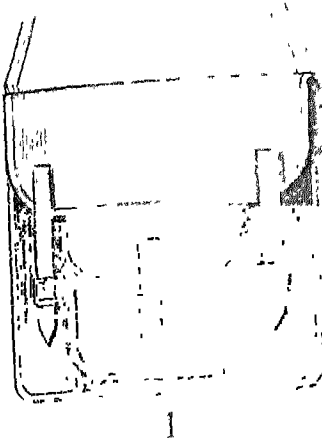
means the general form will become the dominant feature of the lesson.

Exercise 1.—Suspend a school satchel or a music case against the blackboard in an upright position, and draw attention to its general shape. The children will notice that the lines are not firm like those of their shape, and that the corners are slightly rounded. Let them draw the object in outline in the shape which suits it best; the teacher will then discover to what extent their observation has expressed itself. The school bag will require two similar shapes within the outline to indicate the pocket. These can be put in, and the flap added afterwards The music case is drawn in a similar way The children will probably want to suggest fastenings and a strap or handle. This is permissible, but as we are concerned only with general shapes, the details may be left to the children's initiative and the teacher will deal with them later in the course, Figs 1 and 2.

Exercise 2.—Suspend a towel on a piece of string across the blackboard, so that it resembles the familiar sight of an object on a clothes line The children can draw an irregular line for the string, and upon it place the oblong so that the long sides are at right angles to the cord. A few leading questions by the teacher will soon discover a difference in the character of the line made by the edges of the towel, as compared with the lines of the objects in the previous exercise—it is a softer line and not so rigid. Encourage the children to express that difference in their drawing. In this way they will begin to realise line values Additions of border or fringe can be made to give interest and truthful representation. As alternatives to the above exercises, the teacher will find the following objects suitable—a kitchen shovel, a whitewash brush, a flag, an open book, a window, a tenon saw, etc. (See Figs 3–6) During any odd minutes let the children practise the drawing of any square and oblong shapes to be seen in the room.

XVI. SQUARE AND OBLONG SHAPES—PENCIL

Sheet of Paper with One Corner Turned Down

Memory drawing.—Show the children a large coloured envelope with the enclosing side facing the children. Ask the children to look at the envelope and think of what they see. They may close their eyes and try to picture it, and then look at it again. In this way they will correct faulty perceptions and make the mental image clearer. This observation should not occupy more than three minutes, when the envelope should be removed.

The children should now try to draw the envelope from memory Care should be taken that the children are drawing thoughtfully and are making use of their mental impressions in their graphic effort. About ten minutes will suffice for them to complete the drawing.

Square and Oblong Shapes—Pencil

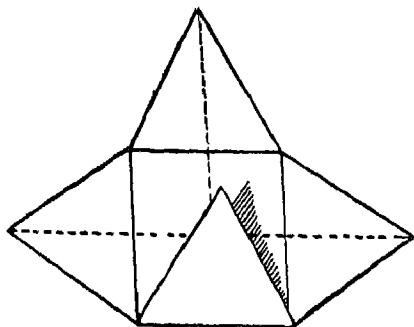
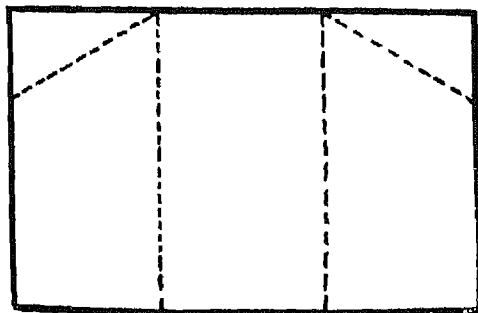
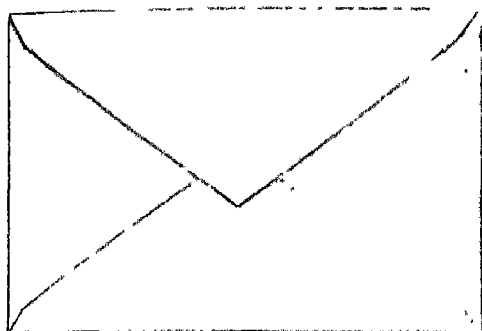
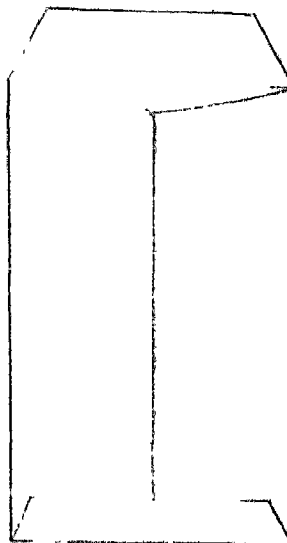
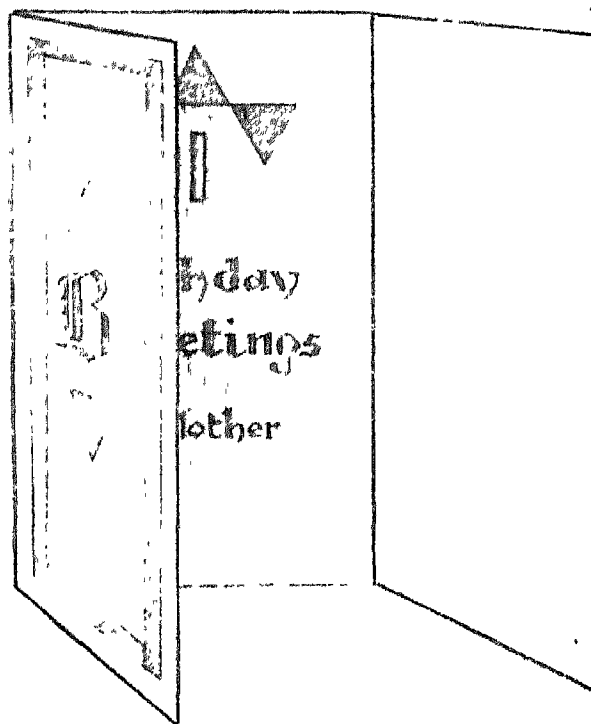
1 School Bag 2. Music Case 3 Hanging Towel 4 Whitewash Brush 5 Open Book 6. Tenon Saw.

Make a general survey of the result, collect a few drawings and pin them to the blackboard. In this way the children who have made good copies will have their impressions verified, and those whose perceptions have been vague will quickly correct them.

A useful addition would be to show the class a sheet of paper with one corner turned down, and ask them to draw that from memory The test would show whether the triangular fold would fit the corner of the shape from which it was taken.

XVII. HANDWORK—FOLDERS

Handwork preparation.—Paper, scissors and gummed coloured paper will be required for this lesson on the construction of envelopes from square and oblong shapes. Ask the children to draw a 6 in. square on their paper and halve the sides; join the halving points Now cut out the square cleanly and fold the triangular shapes inwards to meet at the centre Straighten out the folds Now we have discovered the method of paper folding to make an envelope Our model will not fasten so we must go a step farther. Cut out a 3 in. square, halve the sides of the square and through the halving points draw a line projecting 3 in beyond the square on each side. Join the ends of these lines to the corners of the square, and then cut the shape out Now fold the triangles as in the first exercise; commence with the left flap and then fold over the right A little gum or Gloy will fasten these together. Now fold the bottom flap over and fasten it down by both edges. By folding the top flap over and leaving it loose we have an envelope By similar methods we can make an envelope of an oblong or rectangular shape and by a little ingenuity we can vary the shape of the flaps and devise some good patterns of envelopes, Figs 1 and 2

Exercise 1.—By simple folding and the use of coloured gummed paper, attractive folders and cards can be made and decorated If stiff tinted paper is available, the result will be much more pleasing and satisfactory A simple folder can be made by cutting out a rectangle and dividing and folding it into three parts Trim the outer section by slicing off a triangle at each corner. With the coloured paper the children can decorate the outside with a border or an all-over pattern, and on the inside centre they may place a wish or motto in neat script or other lettering. In the same way the children can invent cards, calendars or folders of their own design, and decorate them with the coloured cut-outs, Fig 3

PLAN OF AN ENVELOPE

PLAN OF A FOLDER

HANDWORK—FOLDERS

1 Envelope   2 Foolscap Envelope   3. Greeting Card

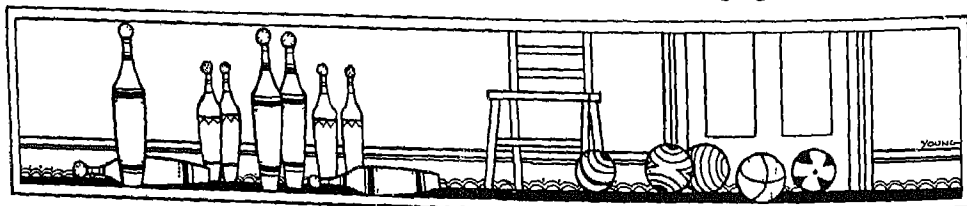
XVIII. SQUARE AND OBLONG SHAPES—PASTEL

(Colour Plate No. 162 D in the portfolio.)

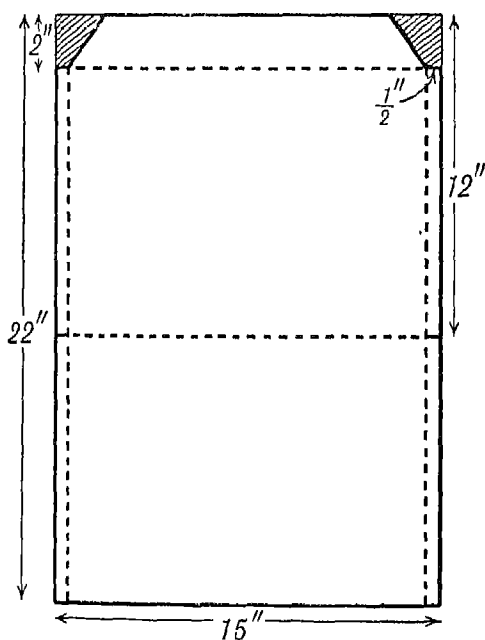
Introduction.—The children will now be able to make drawings in charcoal of the required shapes, and they can apply their pastel to the right texture. As a preliminary test they should draw a 3 in. square and apply blue pastel over its surface. Blue is difficult to manage and must be put down lightly in a first grade rendering, and colour must be added to reach the required texture afterwards. The children should work their colour horizontally, holding the pastel under the hand. The edges must be clean and tidy.

Exercise 1.—Pin on the blackboard a blue envelope with a slip of red or yellow paper showing inside it hiding the flap (see Colour Plate). This will make a useful exercise in colour selection, in grading and the placing of one colour against another Ask the children to choose the red pastel which corresponds to the red paper and apply the colour to the triangular shape first. This shape is small and will offer little difficulty. It will assist further to define the shape to be coloured in blue. In the same manner the blue should be selected and applied to the remaining shape. Great care will be necessary in working the blue against the red, but if the colour is applied in grades no blending should appear at the junction of the colours. The purpose of the lesson is to teach the clean and careful use of the chosen colours.

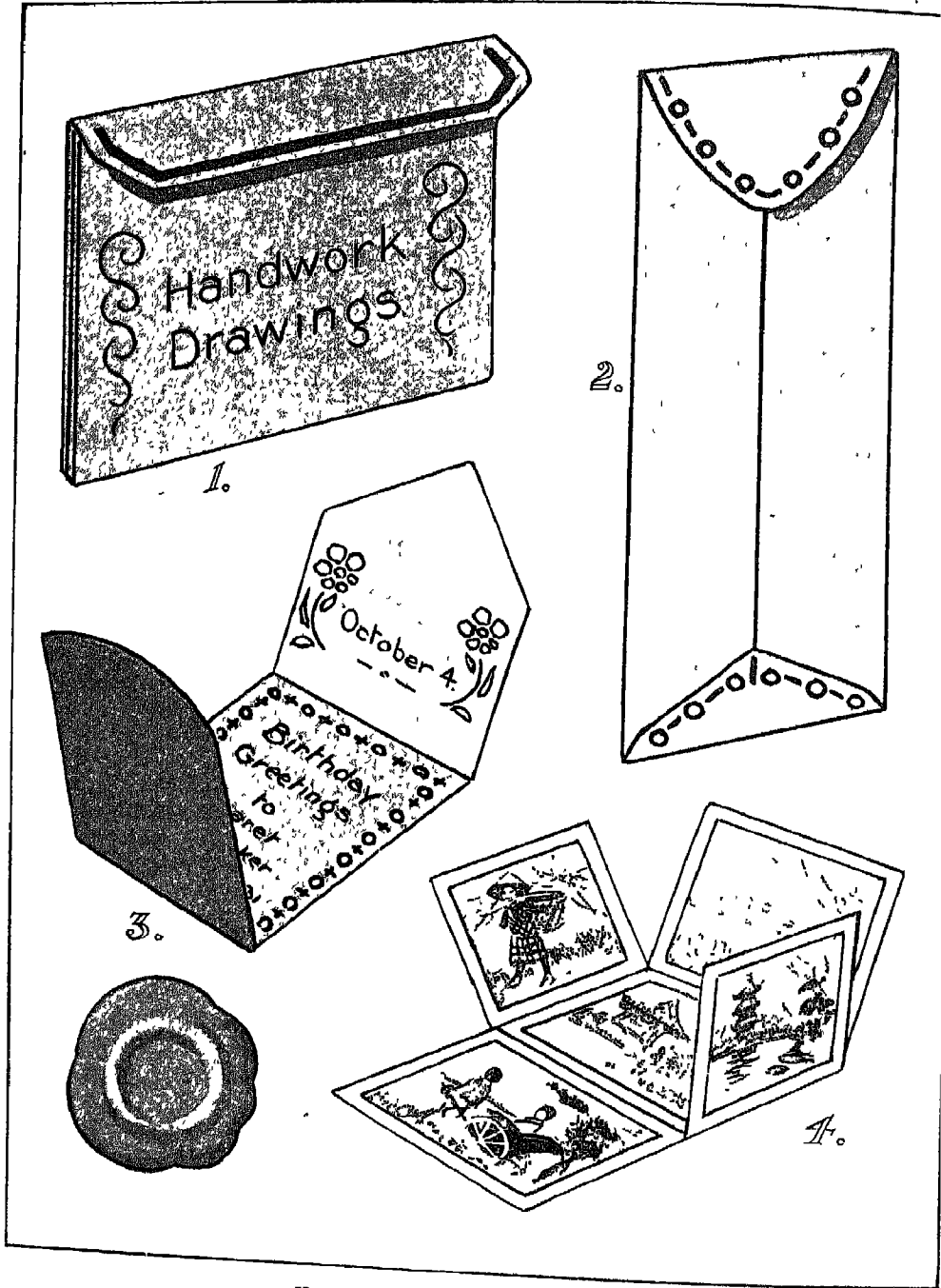
Exercise 2.—A further exercise can be supplied by the use of a red coloured belt with a line of a different tint or colour. It is a simple shape with a small surface but it makes an interesting object. It should be displayed with both colours or tints showing (see Colour Plate). The exercise can be used for colour selection, but the children may proceed in their own way to make a rendering of the belt. With the use of a little charcoal and white they can represent the buckle. Possibly, too, some children will recognise and represent variations of colour Some children with good colour perception may desire to use yellow or purple to secure tints or tones of their colour.

Exercise 3.—("Colour memory.") The colour perceptions of children are often overlooked, and there is a danger of neglecting them. The most vivid sense impressions of children are connected with colour, and the teacher may gain much useful information by recapturing those impressions by an exercise in "colour memory." For this purpose the children may be asked to draw in colour something which belonged to their infancy—a knot of red hair ribbon, a red scarf, a red and yellow ball, a train signal, or a red and blue ninepin with a yellow ball Each or any of these will serve our purpose to revive in a pleasurable manner the colour perceptions of the children, and incidentally the associations belonging to them.

XIX. HANDWORK—HOLDERS AND FOLDERS

Introduction.—The teacher will be well advised to let each child keep a record of the drawings made for the various models constructed for this course This will not only serve for the purposes of reference and order, but will form the correct training for handicraft of every kind. Such drawings should be kept in the pupil's own holder, and it is intended to construct such a holder in this lesson.

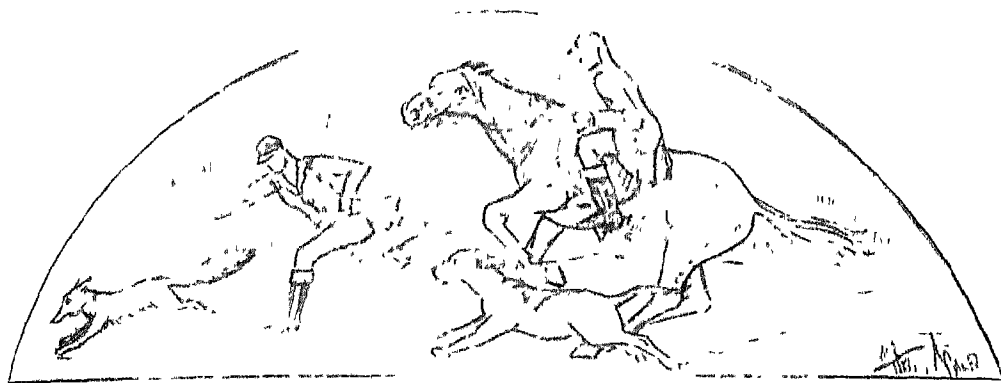
Exercise 1.—Each child will require a half sheet of brown paper 22 in. long and 15 in wide Mark 2 in from the top along each of the long sides, and also 12 in. from the top along each of these sides Draw lines across joining these points, to indicate the folding lines Mark ½ in. from the ends along the short sides at both top and bottom, and join these points by drawing two lines parallel to the long edges Make a half-inch cut into the line across the paper 12 in. from the top Fold the half-inch side borders inwards after cutting away 2 in from the top to give room for the flap to be folded Fold the whole shape up along the middle line Straighten and press all folding edges Apply paste or Gloy to the outside of the half-inch flaps and fasten them neatly and securely together. The flap of the envelope can be shaped by marking off ½ in. from the corners along each side and cutting these top corners neatly off Lettering can be added for the purpose of indicating the use of the holder—Handwork Drawings—and the owner's name A simple spot and line decoration will add greatly to its appearance, Fig. 1, page 52.

PLAN OF A PAPER HOLDER

Exercise 2.—Further simple models of paper bags and envelopes may be devised by the use of rectangular shapes of paper, Fig 2. The general method having been indicated by the teacher, the children will be able to devise some of their own choice. A little practice of this kind will lead them naturally to the preparation of paper folders. These may be made in a variety of shapes and may be used as programmes for concerts, school sports, etc., and may be suitably decorated, Fig. 3

Exercise 3.—Yet another form of picture folder is suggested by taking two strips 9 in long and 3 in wide and gumming them to each other at their centres to form a cross The outside squares will be folded inwards along their dividing lines, Fig 4.

HANDWORK—HOLDERS AND FOLDERS

1 Paper Holder 2 Decorated Envelope 3 Greeting Folder 4 Picture Folder

XX. BRUSHWORK AND PATTERN MAKING

(Colour Plate No 161 B in the portfolio.)

Introduction.—It will have been seen from the previous exercises that the art of colour grading presents an equal difficulty to almost every child, and that this difficulty can be removed only gradually by a series of lessons in which a colour scale forms an important part It is proposed in this lesson to compose a colour scale, and with it apply the training in colour grading to an object of indefinite form The purpose of the lesson is to assist the children in colour selection and make some approach to true colour representation Ask the children to draw a 1 in square at the left centre of their paper, using a paper shape as a guide. They should mark the square K, this being the position for our key colour. Similar squares placed above and below in line with K, and at even distances, will serve for tints and tones.

Exercise 1.—Having all equipment ready, the children should now take up some red body colour on their brushes and apply it to the square marked K They should start from the centre and work the colour to the edges of the square, cleanly and evenly Now tell them that they are going to place lighter reds in the squares above K, and darker reds below K, marking the tints in order A, B, C . . and the tones or shades *a*, *b*, *c* . . . To the red colour on the palette add a little white, mix gently and paint on the square above K Proceed in this way until the children have a series of tints grading almost to white paper Brushes should now be cleansed with the rag, and to a new dab of red they can put a little black, and then apply the new tone to the square below K. Continue until a good dark red is obtained In this way a colour scale has been prepared and the children have learnt how much added white or black is required to give a certain tint or tone. With this knowledge the children will be able to make a better choice of colour for their next exercise

Exercise 2.—We have left a wide space on the right-hand side of the paper to be used for painting a red bonbon, Fig 1 The teacher can show an ordinary bonbon or make one from crêpe paper After the children have noted its general shape and colour, it can be put away as it is not to be accurately drawn With the red colour

and the free use of water, the children can paint the shape about six inches long. It is now a flat shape and the children will wish to show the lighter and darker parts of the bonbon Refer them to the colour scale, and leave them to select that which will suit their purpose When they have chosen, they will recall how much white or black was required to produce square C or square *b*, etc They can make their mixture and add carefully to the body colour of the bonbon It will be interesting to compare these results with the exercise of the first lesson.

Exercise 3.—As a further exercise a stick of rhubarb will provide useful practice in the choice of grades of colour. The stick should be cut off just below the leaf, and shown to the children Questions on the grade of colours to be used can be made in reference to the object, and these will enable the children to match their colour to the mental image formed after the rhubarb is removed. It is important that they should not be asked to draw the object. As its form is indefinite they will not be hindered from making a shape which will accord with their colour perception, Fig 2

XXI. DRAWING FROM NATURE—PENCIL

Introduction.—We shall continue our practice of drawing single leaf shapes by taking a few of those leaves which offer no difficulty in outline, being free from notches or serrations, and whose structure depends largely on the relation of outline to midrib It is possible, in rural districts especially, for the children to supply the names of such leaves, and the teacher should have specimens of each to show the class Such simple leaves are those of the bay, laurustinus, aucuba, Portuguese laurel, syringa, apple, etc

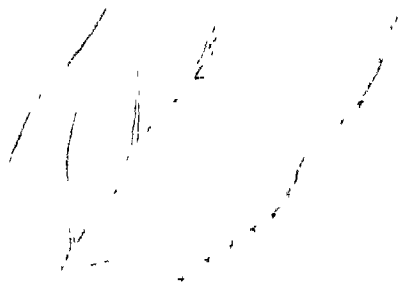
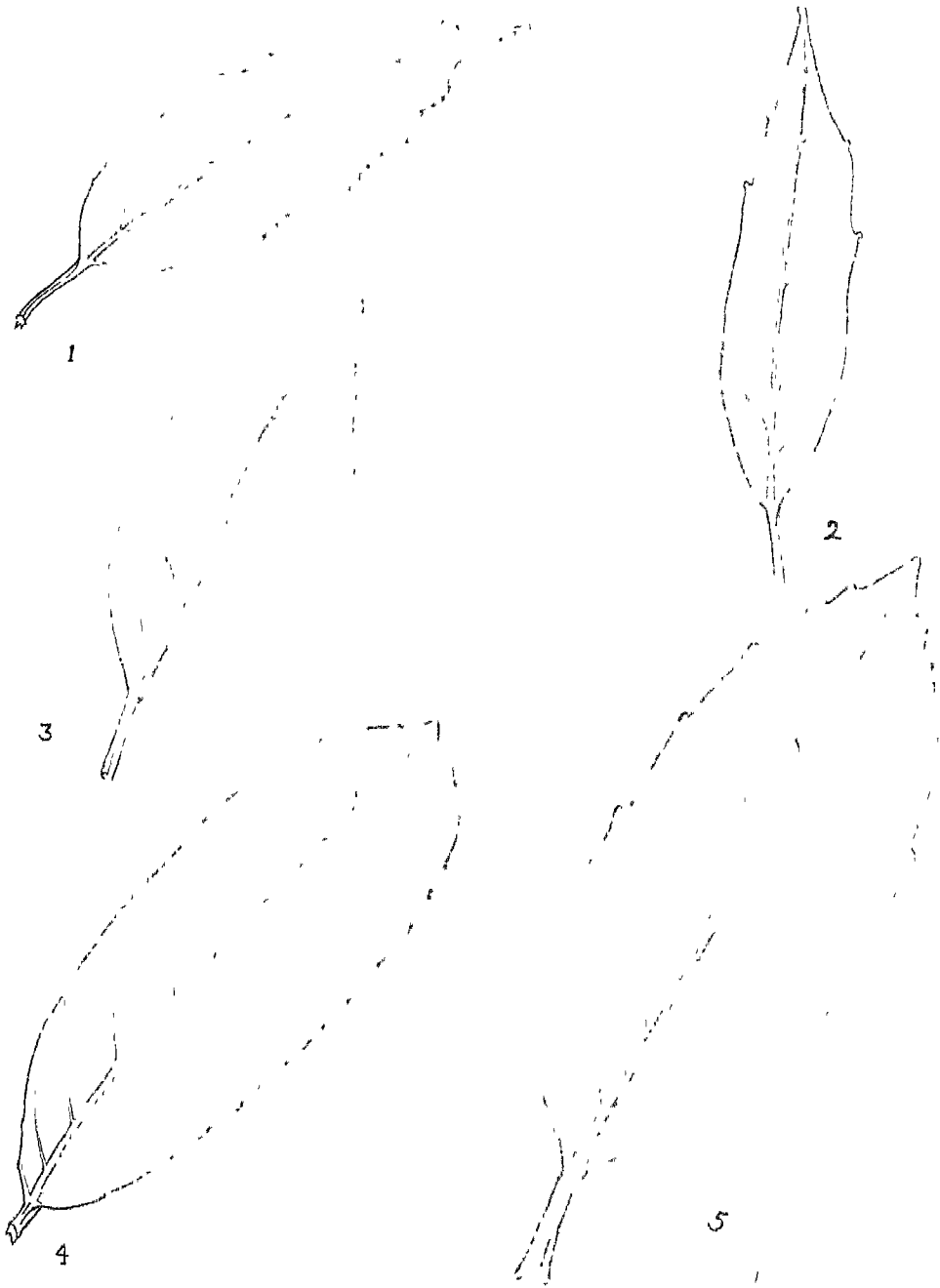
Exercise 1.—Supply each child with a leaf of Portuguese laurel which is available at any time of the year both in town and country. Each child should place the leaf on the page opposite to that on which he is to draw. Refer to the work of the previous lesson and to the clay model of the laurel leaf, and enquire how the new leaf compares with, and differs from, the first. The children can draw the leaf in the upper part of the page by first placing the line indicating the position of the midrib. It will be necessary to supervise the length of this line, for the majority of children probably have a faulty idea of the size of leaves. Invariably beginners represent plant forms on a small scale If the children compare the length of the midrib with that of their pencils they will generally be much surprised Having done this the children will be reminded of the comparison made with the plain laurel and note the oval base of the leaf, the curves of the outline, and

VEINING OF A LEAF

PLATE XIII

DRAWING FROM NATURE—PENCIL

1 Portuguese Laurel. 2 Bay. 3 Laurustinus 4. Laurel 5 Aucuba

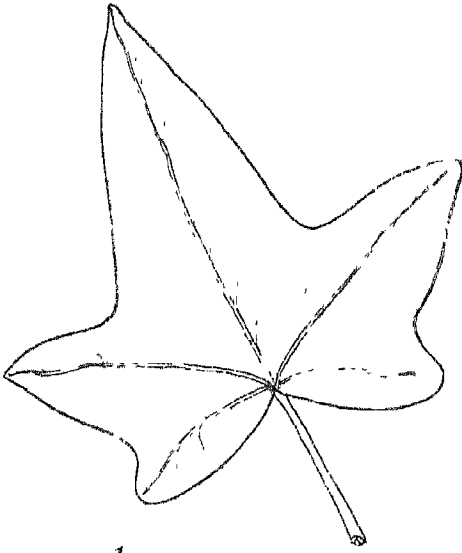
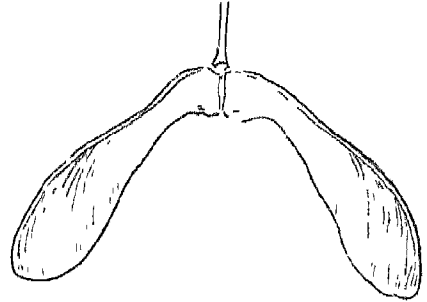
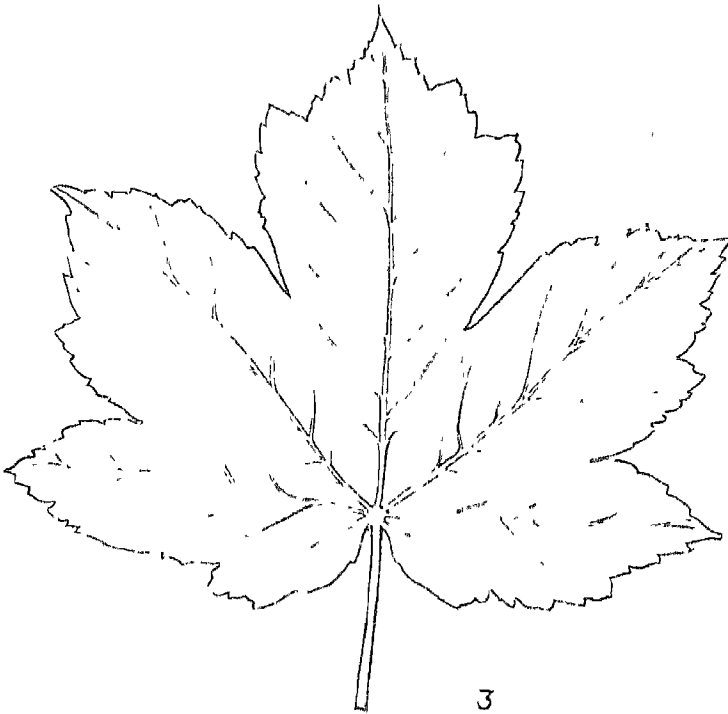
the long point of the new shape, Fig. 1 They may now draw the outline from the base to the tip of the leaf, allowing for the length of the stem. The line should be continuous and not scratched in by the children. In this way the grace and beauty of the line will be felt The work should be light and delicate When this has been done, ask the children to turn their leaves over and examine the midrib which leads to the stem. Careful observation will show them its continuity, and they will then be able to draw the stem truthfully Lightly-drawn veins can next be indicated, these show how the leaf is fed They should flow out of the midrib in a slight curve, and flow slightly upwards towards the outline A vein drawn at a sharp angle is wrong

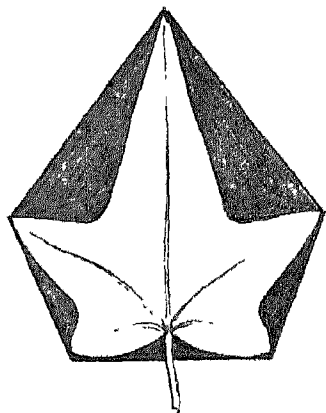
Exercise 2.—As a further exercise the leaf of the aucuba can be treated in a similar manner. The indentations are so slight as to offer no difficulty to the children, while the principle of structure is much the same. It is of course understood that the variegation of the leaf is to be ignored, as texture in drawing is not required at this stage, Fig 5

XXII. HANDWORK AND DRAWING FROM NATURE

Preparation.—This lesson will require preparatory handwork to assist the child-mind in appreciating the structure of leaf shapes which involve lobes and a simple form of radiation Each child should have a fairly large ivy leaf, clay and modelling tools The clay must be pressed out flatly in the shape of a five-sided figure It should be pressed down flat and smooth, and should cover a surface a little larger than that covered by the leaf itself With the pointing stick draw a line from the point of the figure to the centre of its base This line should form a gentle curve like the midrib of the leaf. Similar curves may be indicated from the other lobes to the same point. With the lining tool mark the shape of the leaf within one of the sides of the model, and pare away the clay. Do the same with the opposite side, and so on with the next pair of sides, using the vein as a guide for distance. The base line needs care, and should be pared in halves from a circular opening on the midrib just above the base where the ribs meet. A short stem made from the waste clay can now be added to meet the midrib, and it should correspond in thickness to the natural stem

Exercise 1.—The children will retain their ivy leaves and prepare to make a drawing of them in their books. Refer them to the ray lines in their lesson on circular leaf forms, and remind them of the five lines drawn on their clay model. These were directed to

PLATE XIV

DRAWING FROM NATURE

1. Ivy Leaf. 2. Sycamore Seeds. 3. Sycamore Leaf

MODELLING AN IVY LEAF

the points of a five-sided shape—like the end of a haystack Let the children draw this shape very lightly and put the ray lines in position This is the general plan of the leaf and the drawing of such leaves may be prepared in this way The children will remember marking the irregular curve for the outline on their clay model These lines can now be indicated with the pencil When the five lobes are completed in this way, the stem can be drawn. Good practice can be obtained by placing the leaf in new positions It will train the eye to see the midrib as a guide to these positions, and prepare the mind for placing the leaves correctly on a spray later on.

Exercise 2.—The leaf of the sycamore will provide a useful addition to this exercise, for it is larger than the ivy leaf and its outline is irregular. The leaves distributed should be of fairly mature age, as the young leaves are not definitely characteristic. It is useful for the teacher to make a rough sketch of the plan of the leaf, indicating the radials and the curves at the junctions of the separate lobes. If the children add the veins they must note that they are directed to the points of the serrations In the fruiting season the tree provides abundant seed pods which make an interesting addition to the drawing and lend themselves to design

XXIII. IMAGINATIVE DRAWING—PENCIL, PASTEL OR BRUSH

Introduction.—The child's imagination is aroused by the senses of touch, hearing and smell, and around these impressions associations are gathered. From these impressions each child produces a mental picture which he can express graphically. Thus a train whistle, the scent of hay, or the touch of something warm will each recall some scene complete with the elements for a picture. The teacher should make use of this fact and encourage the children's activity of mind by providing them with opportunities for drawing their impressions.

Exercise.—Prepare the children by telling them that a sound is going to be made to which they must listen with closed eyes They are afterwards to draw anything of which the sound reminds them When all are ready with closed eyes, take up a saw and cut across a piece of wood. Let the sound be unmistakable, and immediately put the saw and wood out of sight. Now the children can draw what has been suggested to them. For girls it would be suitable to slit a piece of calico—a sound heard at home, or in the needlework class or at a

draper's shop The drawings produced will be varied and interesting and will afford the children splendid scope for exhibiting their unaided work

The ringing of a small bell, the filing of a piece of iron, the smell of a lily and many such examples which occur to the teacher can be used for calling forth imaginative drawing of this kind. For such a lesson the medium used may be pencil, pastel or brush

"Snapshot" Drawing

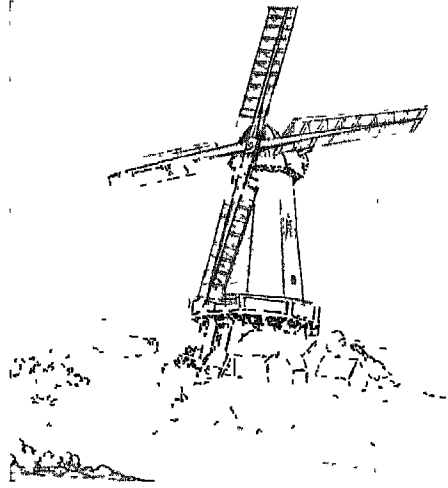
XXIV. BRUSHWORK AND PATTERN MAKING

(Coloured Plate No 161 C in the portfolio)

Preparatory handwork.—The teacher will distribute to each child scissors, red and yellow gummed papers and circular discs 2 in. and 1 in diameter. Ask the children to place the larger disc upon their yellow paper and cut out the circular shape. Let them cut out several of the smaller discs from the red paper. They have now a large yellow disc and several small red ones. Take the yellow disc and fold it across its centre Fold it once more and then flatten it out The light creases will show the disc divided into four parts, Fig. 1. Fold each of the smaller red discs into eight sections, and with the scissors cut across the creases. This will give a number of cut-out shapes, Fig. 2

Exercise 1.—Ask the children to draw an oblong (4 in. by 3 in.) on the top half of their drawing page, and allow them to arrange these shapes in a pattern within the oblong Let them make trials, and where good patterns have been made the children may fasten them down, Fig. 3 Now let them cut out an oblong of yellow gummed paper, fasten it on their page below the previous exercise and repeat the pattern—or a new arrangement—on the yellow ground, Fig. 4

Exercise 2.—The children can now apply their pattern work to the yellow disc. The teacher will ask them to gum the large yellow disc also in the bottom part of their page, keeping the middle crease on the paper in an upright position They can now take one of their small red shapes and place it at the top of the disc so that its point is directed to the centre and its curve touches the outside of the disc, Fig 5. Gum this shape down Now take up the shapes and fit them round the disc with their curves touching the outside ring and with their points towards the centre of the disc. When all the shapes have been placed in position, the children will have an interesting flowerlike pattern with a starlike centre, Fig 5 The pattern can be completed by cutting out a small circle of red paper which can be gummed over the centre.

Art occupation.—It is an interesting and enjoyable art occupation to utilise a simple tune for illustrating rhythm in pattern work Some music produces a mental picture, and pattern can suggest rhythm. The teacher will give the children a piece of tinted paper on which they are to place a simple border

pattern A little blackboard guidance will show them how to space their border, where to place a title, "The Jolly Miller," and also where to draw lines on which to print, in careful script, the first two lines of the song The rhythm can be shown by writing the air on the blackboard thus

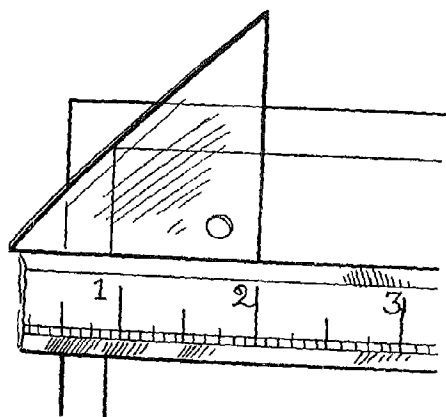
{m | l — l | se —· m | d' ·— d' | t — r'}

{| d' —· l | t.—· se | l — — | — —||

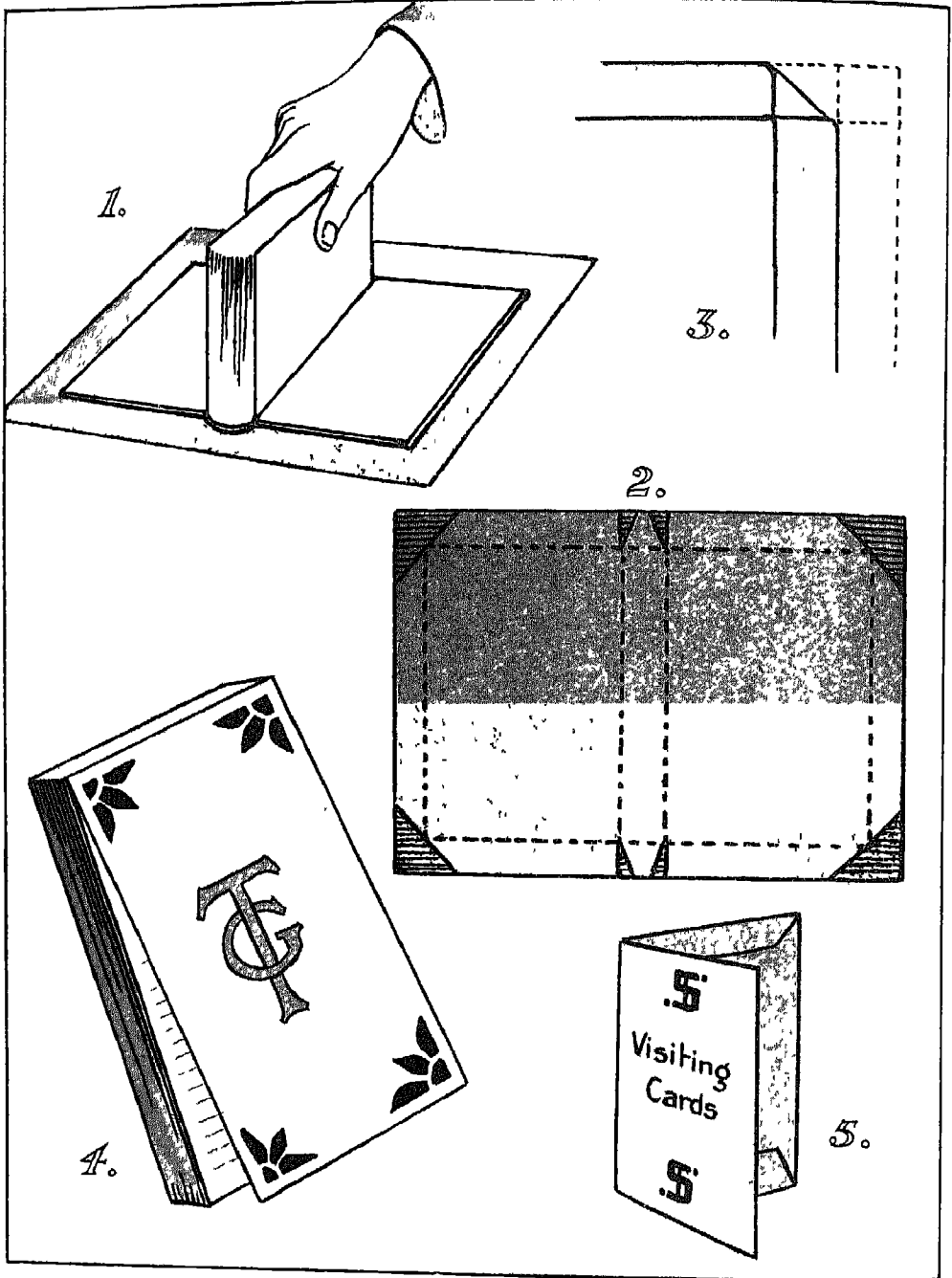
Now if the children take their shapes, they can make a border which will illustrate the metre of their lines:—two shapes, a space, two shapes, a space,—and so on. Place the pattern for the first line at the top of the page, and the pattern for the second line at the bottom They will now have made a title page with much interest and meaning for them, and they will learn to look for these things in similar devices, Fig 6

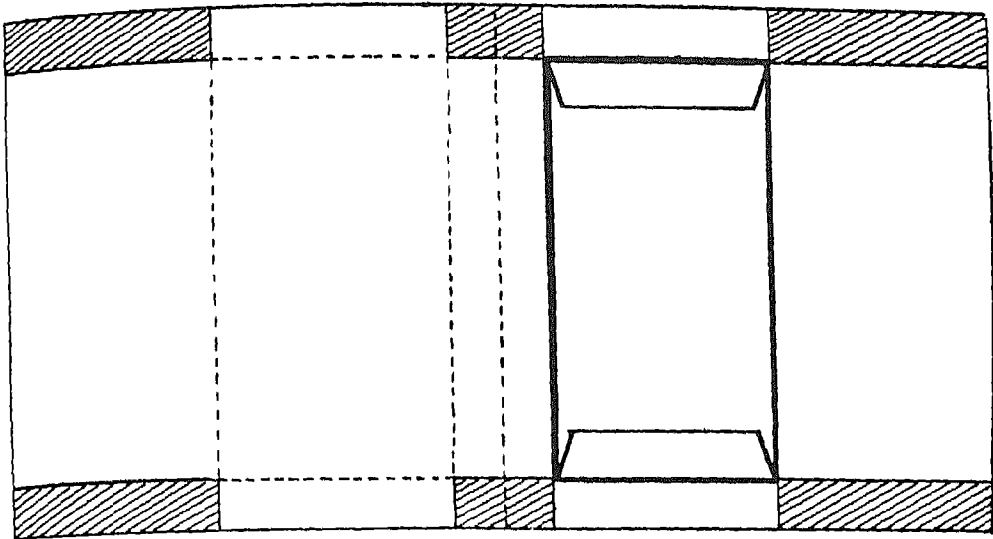
XXV. HANDWORK—BOOK COVERS

Introduction.—Practical exercise in paper folding and cutting is provided by making a paper cover for a book. The particular book to be covered should first be considered, and after observation of the book lying on its back with both its covers extended and the pages held at right angles, a few questions should be asked in order to discover the size of the paper required for a cover The chief measurements which determine this will be elicited by the teacher—the all-over length and breadth, and the flaps for folding These will be combined in a rectangle measuring the total length and breadth required for the cover.

Exercise 1.—Let the children make careful measurements of the cover and apply these measurements to their drawing. It is not sufficient to place the book down and use guide lines. Both back and front covers should be drawn in from accurate measurements The space left between them should correspond to the back of the book. Having decided on the amount of fold to allow, mark the distance from each corner on the long and short sides of the rectangle which represents the actual size of the book These points should be joined by lines parallel to the edges. The whole figure should now be cut out, and shaped flaps cut at the top and bottom of the backing surface Neatly shape the corners by the use of a ruler and 45° set square. Place the ruler perfectly level across the top half of the paper, and the set square so that its sloping edge passes through the angle representing the corner of the book Draw a line along the sloping edge to meet the lines enclosing the flap. By turning the set square and sliding it along, the opposite corner can be treated This should be done for all the corners The lines indicate where the corners are to be cut. The cutting should now be done, and also the wedge-shaped openings for the top and bottom of the back of the book.

How to Use the Set Square

The cover is now ready for the book, which should be placed carefully over the lines corresponding to its shape. First insert the wedge shapes into the backing cloth at the top and bottom, and holding the pages in the left and right hands alternately, fold in the sides carefully and fasten them down. The flaps at the top and bottom should be treated similarly If the cover is not to be permanent, it is wiser not to fix the flaps but to adopt the method of folding the corners of the cover instead of shaping. This may be done by folding the top edge of the corner between the outside of the book and the paper cover. This will keep the cover in position if it is carefully squared and pressed down, Fig 3

Exercise 2.—Another suitable exercise is the making of a card case It would be advisable for the teacher to prepare a model, and unfold it for the observation of the

HANDWORK—BOOK COVERS

1 Covering a Book 2 Plan of a Book Cover 3 Folding a Corner 4 Writing Tablet 5 Card Case

PLAN OF A CARD CASE

class. This will enable the children to note the position of the creases, the number of pockets, the position of the flaps, and the amount of paper required for the model. These facts should be supplied by the children and afterwards applied to their working drawing, Fig. 5 The all-over measurements should not be less than 8 in. by 4 in In the accompanying diagram, the development of the card case is shown

Exercise 3.—A covering for a school writing block, made from tinted paper, makes a useful exercise and lends itself to pattern making and lettering, Fig 4

XXVI. POLYGON SHAPES—PENCIL

Preparatory handwork.—Each child should have some coloured paper from which to cut a 2 in. square When this is done, the square should be folded across Where the corners meet, two small marks should be placed along the sides at equal distances from the corner. This should be done at both top and bottom. With the scissors clip off the corner and place the pieces on one side Now open out the coloured paper and we have found a new shape developed from the square.

Let the children look well at this shape and say what they notice about it—its upright and level lines, the nature of the sloping lines, and its many corners (poly-gon), in this case eight. With pieces of odd paper folded and cut in this way, let the children discover some of the variations of this shape.

Exercise 1.—The children can now draw a 2 in square in their books and fit their coloured shape into it Then fit into the

corners the small pieces which were cut away Look well at the shape left They will now halve each side of the square and draw lines of equal distance on each side of the halving points, referring to their shape. Now join the ends of these lines and the drawing of the shape is complete, Fig I.

Exercise 2.—Pin a large luggage label on the blackboard and the children will note the same kind of shape which they made with a rectangular piece of paper They can draw this easily by the same method, adding the hole and string, Fig. 2.

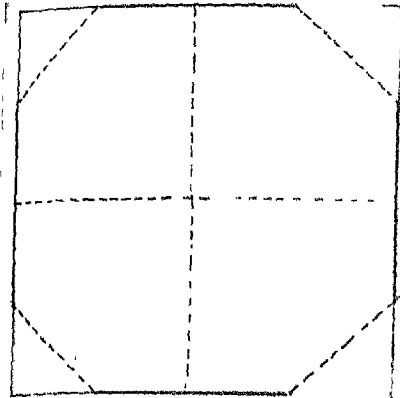
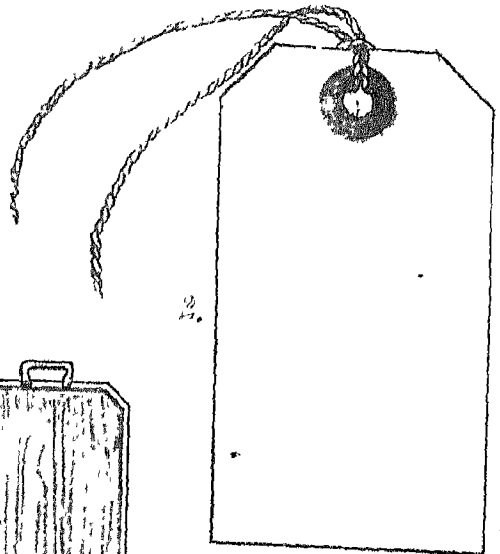
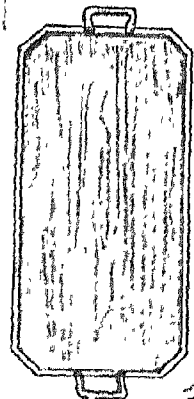
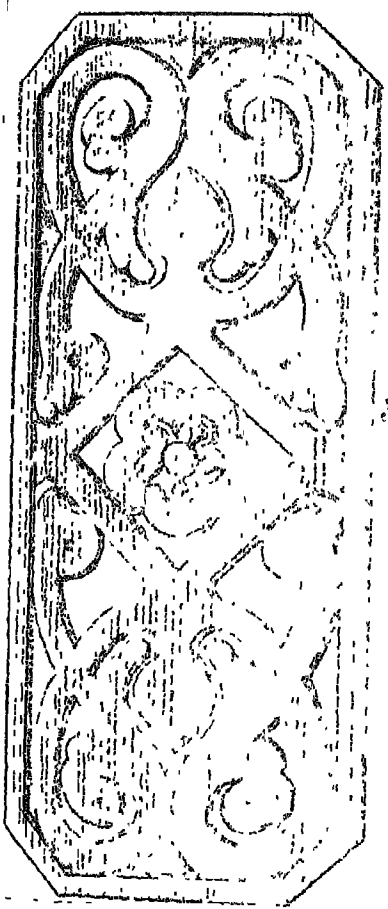
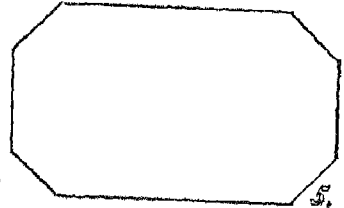
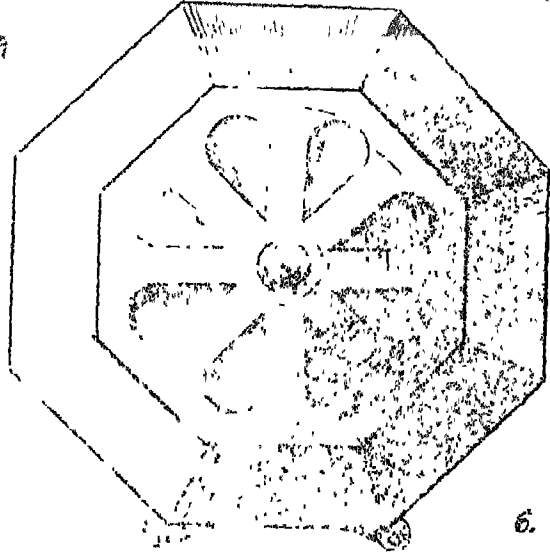
Exercise 3.—As the objects suggested by this shape can be quickly drawn, a further exercise is given—a finger plate of the same pattern, Fig. 3 The object should be fastened on the blackboard against white paper so that its shape is clearly seen. Its length is its most noticeable feature, and it can be emphasised by pointing out that it is made up of several squares How many? In this way the difficulty of proportion will be largely removed. The children should not draw it in squares but indicate the general shape as they perceive it by drawing two long lines and placing the top and bottom where their observation suggests. The corners can then be indicated. Any further ornament can be suggested in simple lines by the children at the teacher's discretion

If further practice is necessary, ticket shapes, trays or panels for lettering can be used, Figs. 4 and 5. A harder but more interesting exercise is the front of an octagonal loud-speaker, Fig. 6

Note that hexagon shapes can be similarly used by making the circle shape in coloured paper and cutting across the curved outlines

XXVII. MEMORY DRAWING—PENCIL, PASTEL OR BRUSH

Introduction.—In this lesson on memory drawing it is not intended to exercise perceptions stored in the memory—as a direct exercise would do—but rather to discover what perceptions are made in a short period of time The object chosen is a clothes peg, for this involves little difficulty in drawing but provides a useful test of intelligent observation.

Exercise 1.—Supply the class with some pegs of the split wood type and give the children the opportunity of both handling and examining them for a few minutes. This method of observation is preferable to the teacher holding a single peg before the class. The pegs should then be collected and the children asked to draw their impressions of a peg. Let the children choose their own position, for it is quite possible that some will like to show the third dimension or thickness which they have discovered by handling the peg. The children should work freely without criticism. When they have completed their drawings the teacher will quickly discover the general faults Individual faults such as small drawings or poor line work can be dealt with separately The general fault may be lack of observation in the construction of the peg The teacher can correct this by unfastening the tin binder and showing the split portions of the peg, then replacing them and putting the binder in position The children will now observe more carefully the splay of the openings and the gradual closing up to the binder. It may be necessary for the teacher to draw black-

Polygon Shapes—Pencil

1. Octagon. 2. Label 3. Finger Plate 4 Tray. 5 Ticket 6. Loud Speaker.

board sketches in order to show these points more clearly. In memory drawing it is important that faulty perceptions should be corrected at once; it is not sufficient to tell the children that their drawing is wrong, for in such work as this they require constructive criticism.

Exercise 2.—The lesson may be completed by an exercise on the direct memory method. This should be in the nature of something interesting Boys may be asked to draw a partly-opened penknife, while girls can draw a purse. Children delight in drawing these personal possessions, and the memory will be actively stimulated by the effort to reproduce them. The children should be allowed full scope to express graphically all that they wish Such freedom often discovers native ability, and the charm of drawing unfettered by instruction may frequently be encouraged with advantage.

The medium used for memory drawing need not be confined to the pencil. Some children will do excellent work with the pastel or brush, and although many drawings will appear somewhat disappointing, it is only fair that the more proficient should have an opportunity of showing their ability.

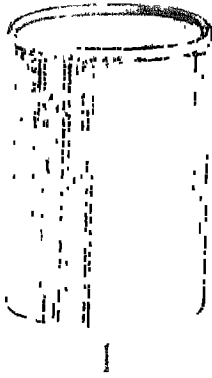
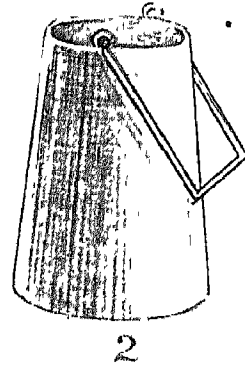
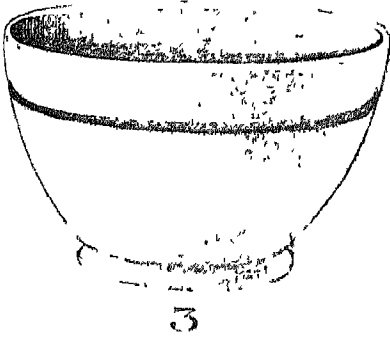
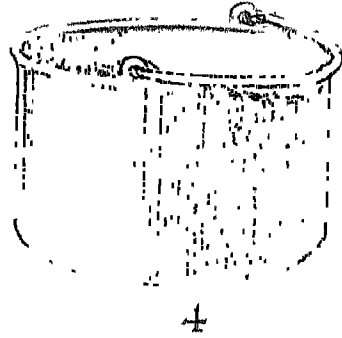
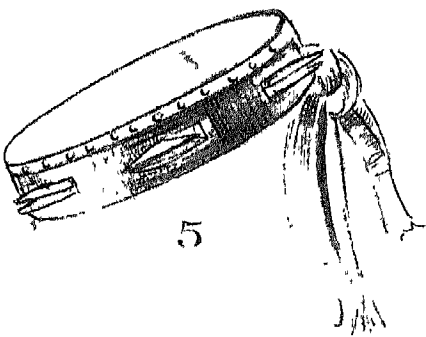
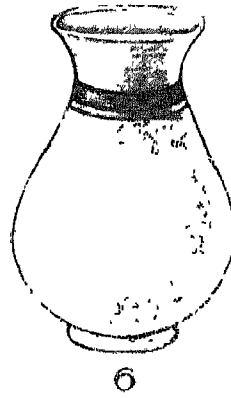
XXVIII. ELLIPSE SHAPES—PASTEL

Ellipse Shapes

Introduction.—By means of pastel drawing, this lesson will mark the first approach to the representation of objects showing the third dimension This does not imply the introduction of the principles of perspective, but the expression of those principles by the aid of shapes The method suggested is both useful and effective at this stage There is no necessity to teach rules which will more easily be acquired later with colour shapes as a background.

Preparation.—Cover the surface of a cylindrical paper or cardboard box with blue paper, and its ends with yellow paper. A large disc of red paper should be shown by the teacher and used for the purpose of illustrating the fact that the ellipse is the fore-shortened circle. The teacher should hold the disc at the ends of a diameter and slowly revolve it so that the children see the red circle gradually changing its shape The distance between the teacher's hands remains the same, but the diameter at right angles grows shorter until the disc becomes a line The experiment should be carried out by holding the disc both vertically and horizontally

Exercise 1—Now refer the children to the coloured cylinder and by raising it or lowering it provide new views of the yellow disc Ask the children to show with yellow pastel what they see when the disc is in a certain position This will be varied by showing additional positions, and the children will easily express these changes on their paper

Now the children are prepared to draw the cylinder. They can first put in the ellipse as they view it, and fit to this shape the blue shape of the surface. This will

ELLIPSE SHAPES—PASTEL

1 Jar 2 Tea Can. 3 Bowl. 4 Paint Can 5 Tambourine. 6 Vase

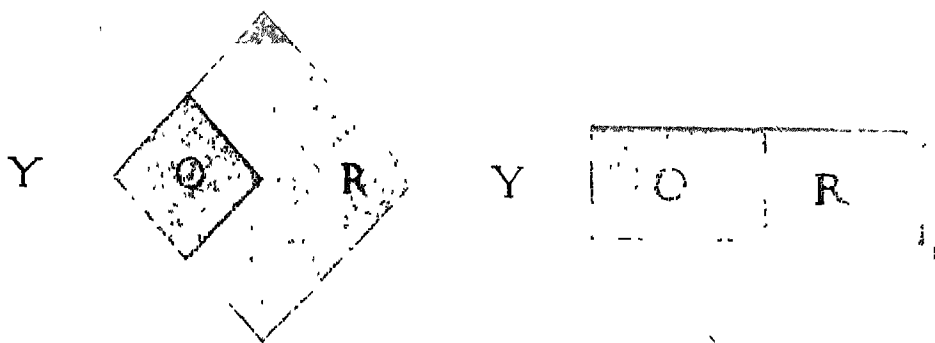
offer little difficulty particularly if the base is shown to the class, for they can then see that the base curve corresponds—very nearly—to the curve at the top. The reason for the differences that they show will come later. In this way, by the consideration of shape only, the children will have expressed length, breadth and thickness.

Exercise 2.—Many objects will be suggested by the cylindrical shape, and the children will realise that they have entered upon a new phase of their drawing. For our object we have chosen a tea can (omitting its lid), Fig 2. As it stands on the table we see two shapes, a white one and a blue one. The white shape is like the yellow disc on the cylinder and forms the opening of the can This can be drawn in pastel and the blue shape fitted to it as before. The usual precautions as to the application of colour are necessary, and the teacher will try to secure drawings with clean edges and even texture. The children may be encouraged to express grades of colour produced by light.

Exercise 3.—For the next exercise a coloured bowl may be drawn by the same method The bowl should be of a simple colour scheme with good lines, Fig 3.

Other objects suitable for this lesson are a paint can, tambourine, pot of jam, jug, vase, saucepan, basin, washing-bowl and canisters of various kinds.

XXIX. PASTEL DRAWING

(Colour Plate No 163 C in the portfolio.)

COLOUR BLENDING

Introduction.—It is now possible to go a step further with our pastel drawing and use the primary colours to find the secondaries. The children will remember the lesson in which the red and yellow balls were used, and the teacher will show these again. With these two colours we are going to make a new colour. Provide the children with a good red and a chrome yellow Now show an orange-coloured ball, and ask the children which of the primaries it is most like. It is more yellow than red, yellow is the predominant colour. We are to blend yellow with red by mixing grains of powdered colour as we mix paints with water

Exercise 1.—On a pastel paper draw with charcoal a rectangle about 6 in long and 2 in. broad Divide the rectangle into three parts. Over the whole surface place a first grade covering of yellow (the predominant colour). From the end of the first third of the rectangle, add a first grade covering of red. We shall see one third yellow and two thirds reddish-yellow On the last third add yellow, working the colour in the form of a figure 8, and the new colour—orange—will appear, Fig. 1 Our rectangle shows not only our new colour, but the steps by which we produced it We shall work in a similar way to produce green and violet when we have the opportunity.

Exercise 2.—Place the yellow and red balls from the Froebel gift box in view of the class, leaving a good space between them, place a background of the same coloured paper as the children are using. The children will now draw in a row on their paper three equal circles. In the first and second circles they will place a covering of yellow; in the last circle they will place a covering of red. Now by adding red to the middle circle they will make a reddish-yellow colour. To this they will add yellow—as in the rectangle—and soon an orange ball will appear Place the orange ball between the yellow and red, and give the children the opportunity of comparing their work with the actual colours. Here again the copy on the Colour Plate illustrates the method, Fig. 2.

Exercise 3.—Show the class a large clean carrot and ask the children about its colour. It is orange in colour, but different from the orange colour they have already made. Instead of yellow showing most strongly, the orange colour is reddish The red predominates in this case. The children can draw the carrot and they will remember that while they are to blend yellow with red, the red will be used first and last. This exercise will afford a useful experiment with colour and will be of great assistance in colour selection Tints and tones can be added by the careful use of black and white This needs great care in pastel drawing and may be done only by light application, Fig. 3. Later on a better method will be used

Oral.—Test the children's memory of colour by showing orange-coloured papers and asking them which is most like the orange ball, and which like the carrot. Can they give the reason? Other objects can be recalled—an orange, a cricket bat, a marigold, tool handles, etc. Finally, if the teacher will cut out shapes of yellow and red tissue paper and fasten them overlapping each other on the window pane in a good light, the children will see the orange colour on the overlay, Fig. 6

XXX. DRAWING FROM NATURE—PENCIL

Introduction.—If possible, provide each child with a simple spray—not more than two or three leaves,—of oak This spray is chosen because it is easily obtained and the leaves are irregular in shape The children should have pointed pencils for their nature drawing, and their sprays should be placed on the opposite page of the book in which they are about to draw. Give some preliminary instruction on the best method of examining the spray, and with a typical spray make the analysis clear by drawing on the blackboard. This first lesson on sprays needs broad treatment; so begin by pointing out the direction of the midribs and how the spray is built up on the stem,

Fig. 1. This method seems to be the most rational, and forms a definite plan of work Indicate the build by illustration, and insist on the necessity for a plan of work as the usual procedure in a drawing of this kind. Children rarely perceive a spray of foliage as a whole, but they must be guided to do so. If left to their own methods they will begin without a plan and the parts of their drawing will have no relation to one another.

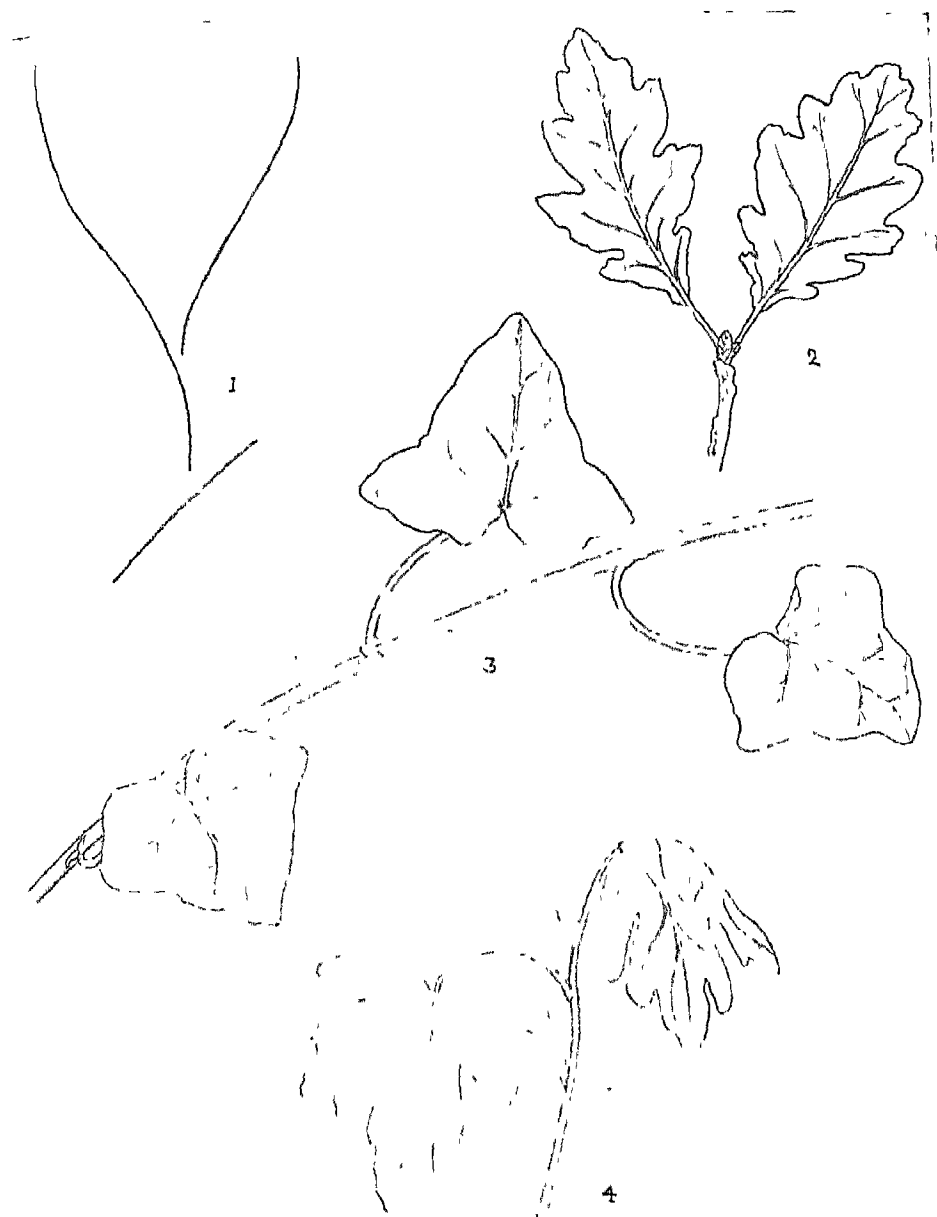
Exercise 1.—The children should examine the spray of two leaves which lies before them, and trace in the air over the spray the direction of the stem and midribs. This action will supply an additional reason for their method of drawing They can now draw the main lines on their paper Time spent on this preliminary work is valuable at this stage Length, direction and continuity of line must be secured Ask the children to close their eyes and say how many indentations there are on one side of the oak leaf Experience shows that the numbers are usually exaggerated, and the majority of children will answer that there are seven or eight Let them open their eyes and count, their surprise will stimulate their memory and their effort. They can now draw the larger leaf, noticing at the same time the position of the neighbouring leaf In drawing the leaf they should begin at the top of the midrib and draw down to its base. This method helps the children to produce continuity of line and it assists the sense of direction back to the stem The second leaf can be drawn in the same way Up to the present we have thought of the leaf shapes. Now look at the spaces between the lobes of the leaves and compare them with the spaces between the leaves of the spray. This is an important part of the lesson and should initiate a method always to be used When sprays are supported in clay, the leaves will take their natural positions and in consequence there will be natural spaces Look for these in every exercise on plant form, for they will be found almost as characteristic as the leaf shapes. The children can now make their joints and draw the stem Much of the drawing will be crude, but in a further lesson details will be dealt with, Fig 2

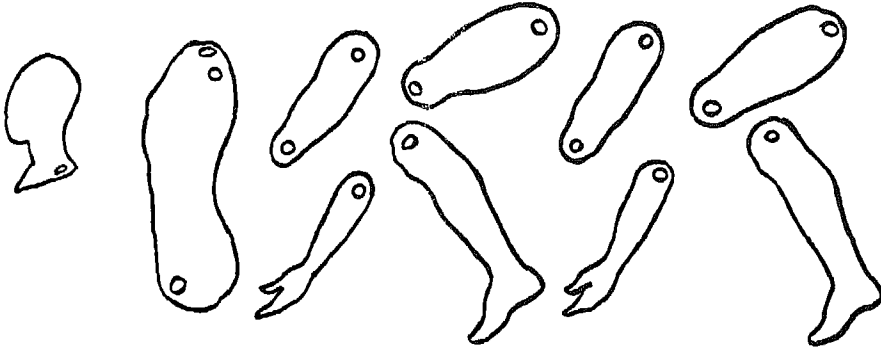
Exercise 2.—A simple spray of ivy will form the next exercise in which the same methods can be adopted The leaf has been already dealt with in a previous lesson, and after the first planning of the spray, simple lines of radiation for the chief veins will be added to assist the leaf shape Correct the tendency to draw the leaves too small—so common in nature drawing—and endeavour to secure good, clean line work, Fig. 3

XXXI. HANDWORK—ACTION FIGURES

Introduction.—This lesson is given to assist the drawing of figures such as may be required for imaginative or illustrative drawing It takes the form of constructing simple action figures which may be adjusted to express certain attitudes or postures By the use of these quaint figures the children will realise that it is easier to draw figures in action than to make the rigid dummies which most of them draw for purposes of illustration.

Exercise.—Provide the usual cutting out materials with cardboard, and if possible metal eyelets which can be secured with a punch. (String knotted closely may be used as a substitute for the eyelets) Use the blackboard to illustrate the parts and joints of the figures only, leaving the children to choose their own shapes The drawings should first be made separately—head and neck, trunk, arms and legs The total length of the figures should be about 3 in,

PLATE XVIII

DRAWING FROM NATURE—PENCIL

1 Plan for Spray. 2 Oak 3 Ivy 4. Sycamore

PARTS OF A HUMAN FIGURE IN CARDBOARD

and the simplest shapes will do. The head and neck should be drawn in one piece, the trunk and limbs may be straight or shaped as the children fancy, but the arms and legs must be in two pieces

When these have been drawn, they should be cut out, and the teacher will either fix and punch the eyelets, or distribute strings which can be used to make the joints, but they must be knotted closely and neatly With plasticine fastened to the feet these little figures will stand; and by adjusting the parts many actions can be illustrated To secure better results the hands and feet can also be jointed. The children should use their figures by posing them for definite actions suggested by the teacher—walking, running, sitting, bending, pulling. Some of these positions should be drawn by the children in a series of quick studies Action lines are chiefly to be looked for, as it is expression of movement that will make their drawings virile. Attempts at delineation of features, dress, etc., will be made by promising imaginative children, and this should be encouraged, particularly where there is obvious intelligence behind the effort.

MODELLED OAK LEAF

Alternative exercise.—The lesson outlined above may be replaced by clay modelling as an aid to nature drawing. The lesson on a simple oak spray or an ivy spray will be amplified in this way The method adopted in planning the drawing will be followed in using the clay, except that the leaf joint only will indicate the direction of the midrib, the leaves being modelled and placed in line with such a joint.

XXXII. PASTEL DRAWING

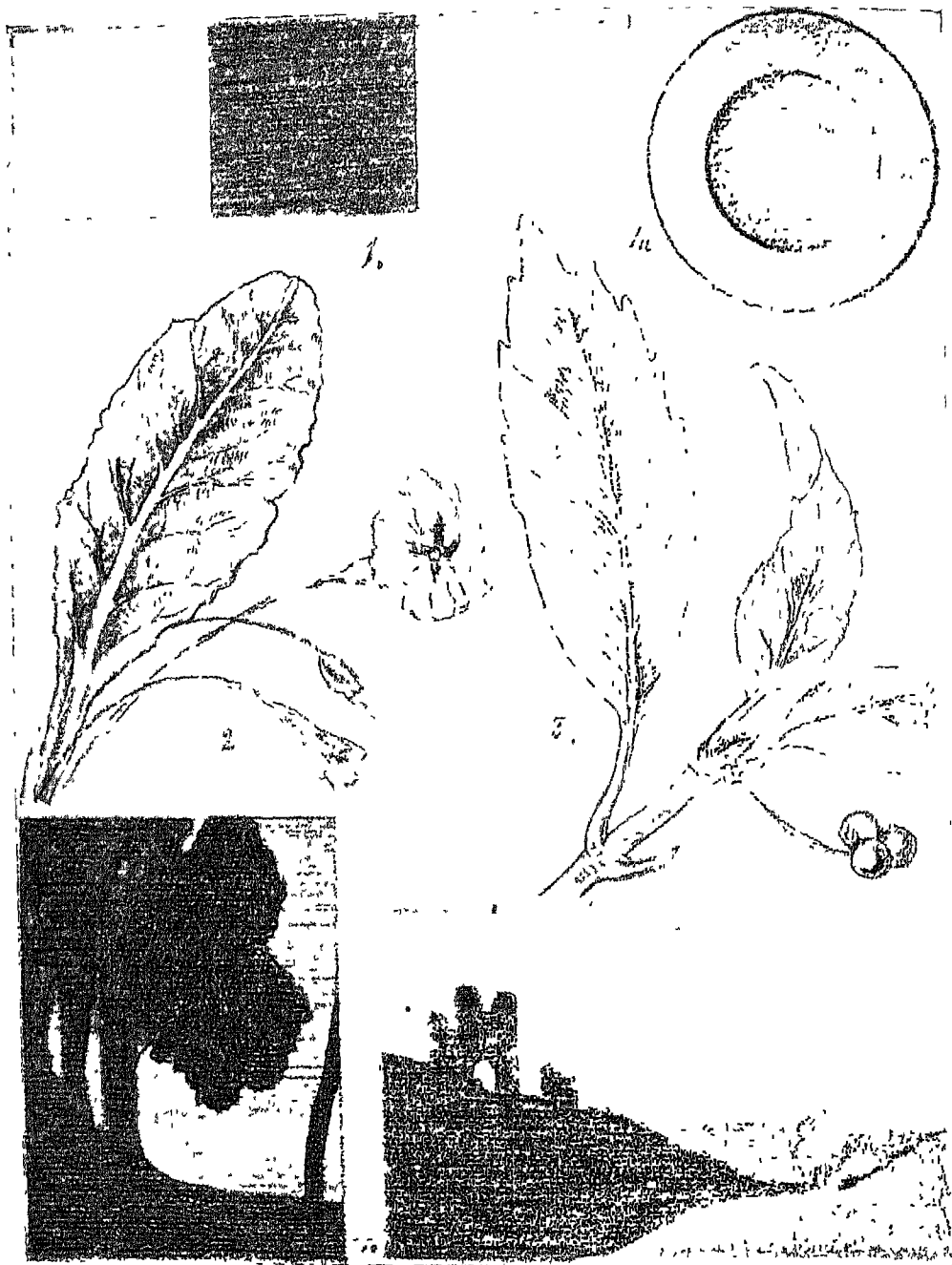
Introduction.—Continuing the work of colour blending, this lesson will deal with the preparation of green and violet from primary colours. The teacher can supply a simple illustration with some tissue papers coloured red, blue and yellow. Place the yellow and blue papers partly overlapping in a good light against the window pane The class will see that the resulting colour is green. Similarly, if red and blue papers are shown overlapping, a violet colour will be given. This suggests what we have to do to produce these colours with pastels

Exercise 1.—Draw with charcoal a rectangle 6 in. long and 2 in. wide, and fill in the shape with the first grade of yellow. Having marked off the thirds of the shape, add blue to two thirds of the shape, leaving one third yellow. Now add yellow to the third division, working the colours well together Green is produced which is light in tint. Enquire which colour predominates in the mixture. Why? What would happen if the blue were put down first and last? In this way the children will find out how to produce a bright green which is yellowish, or a dark green which is bluish, such as is seen in evergreens Our rectangle illustrates the process of preparation, Fig 1, page 74 A similar method of working with red and blue will give violet.

Exercise 2.—Distribute leaves of the primrose or any other pale green leaf of simple shape, and let the children draw the leaf directly with yellow pastel They can then practise their colour blending on its surface to produce the colour of the leaf. The midrib can be indicated by a line of white drawn lightly over the green. The mottled texture can be left unless the children feel that they can indicate it by the use of dark green To add interest, a primrose could be drawn beside the leaf. If the primrose is not available, other suitable leaves and flowers can be substituted and treated on similar lines.

***Additional* work.**—The leaf of the aucuba makes an interesting exercise for the rendering of light and dark green on the same leaf This could be attempted if it is possible for the children to have a small spray with one or two leaves and a berry. The drawing of this simple leaf is an excellent exercise and may be used at the discretion of the teacher, Fig. 3, page 74.

Exercise 3.—The teacher can make the next exercise interesting if it takes the form of an abstract illustration Let the children draw a rectangle 3 in. wide and 5 in long. Indicate by simple lines in charcoal the silhouette of trees and a full moon, Fig. 4. The whole rectangle can be covered with dark blue with the exception of the circle of the moon and the tree mass at the bottom. The moon can be filled in with orange and the tree mass treated by colour blending to produce violet. Care must be exercised to see that the edges are cleanly rendered and the texture smooth and even. This does not suggest rubbing, a practice which should never be allowed. The children will be pleased to add a title to their picture.

PLATE XIX

PASTEL—DRAWING

1 Blending Exercise   1a Green Plate   2 Primrose Leaf and Flowers   3 Aucuba
4 Abstract Illustrations

XXXIII. BRUSHWORK—COLOUR BLENDING

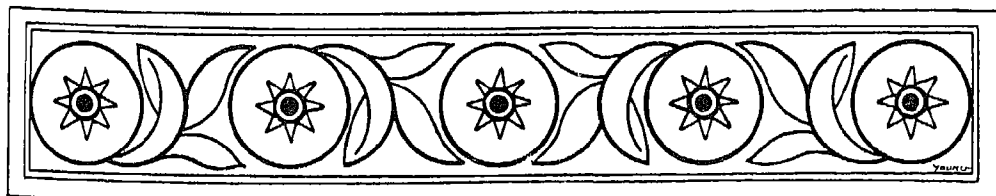
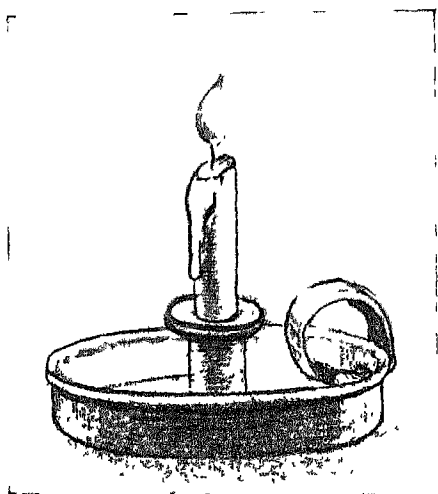
(Colour Plate No. 161 D in the portfolio)

Preparation.—Obtain a number of yellow papers of good colour and exhibit them to the class. A few questions will suffice to test the power of colour perception in the class, and this will be further tested if the children are asked to give the names of any objects of the same colour as a paper shown For future guidance note any errors of perception shown by the children A valuable list of objects for class use may well result from the questioning. Yellow objects —a duster, reels of silk, a banana and a lemon—should now be shown, together with the papers which match the objects selected by the children. In this way children are prepared for the exercise on colour scale which follows. The usual requisites having been distributed, the children can begin their work

Exercise 1.—Refer the children to the scale of reds made in a previous lesson, and ask them to draw similar 1 in squares on the left-hand side of their books, lettering them as before Now in the square marked K place a shape of even body colour in chrome yellow Ask the children if they think that they will have as many tints and tones as in the red scale Why? This is important, as in a later lesson on tone values, this question will be referred to again By adding a little white to the yellow obtain a lighter tint, and so continue throughout the scale. In a similar way, by adding a little lampblack, prepare a few darker shades Encourage great care in the making of the scale Hurrying the work may impair the value of the training at this stage, Fig 1.

Exercise 2.—The children are now to paint a banana, and should be shown the fruit and asked to find the colour grade which most nearly matches its general colour. Let them paint a wet patch of clear water resembling the general shape of the banana Then remove the fruit, and tell the children to make a little mixture—adding white or black as required—from the yellow, and paint in the general shape of a banana Direct them to use their colour scale from which to select tints or tones to render the lighter and darker parts It is possible that some children will wish to add other effects which they have observed This may be encouraged, even though the result may be crudely set down, for such children are seeking after truthful expression, and promising members of the class should not be compelled to conform to the pace of normal progress, Fig. 4.

A further useful exercise will be provided by a lemon. Its rather indefinite shape and its different colour value will give a new test in colour selection. Let the children proceed by similar methods to those used in the previous exercise, having first referred to the colour scale for their initial effort, Fig 5.

Afterwards collect a few good copies of each of the foregoing exercises, pin them to the blackboard, and with the actual objects in full view let the class assess their merits Unconsciously the children will revive and deepen their colour-sense impressions.

XXXIV. DRAWING FROM DICTATION—PENCIL

Introduction.—Tell the children that they are to draw from the instructions dictated to them. They are to express their ideas of direction, length and division of lines, parallels, etc., without any aid but their pencil, paper and their own intelligence

The teacher will dictate as follows, giving the children time to follow the instructions carefully and thoughtfully.

1. Draw a level line 4 in. long across your book about 4 in from the bottom of the page.
2. Put a mark dividing the line into two parts
3. Through that mark draw an upright line 7 in long
4. On this line place a mark 1 in from the bottom
5. Through this point draw a level line 6 in. long, with 3 in on each side of the upright line
6. Join the ends of the level lines
7. On the top level line mark ½ in. on each side of the upright line
8. At those points draw two upright lines, 2 in. long and join their ends.
9. 1 in farther up the upright line draw a level line 2 in long evenly on each side, join the ends with the last line you drew
10. On the highest level line mark ½ in. on each side of the upright line and draw upright lines—one 3 in. long and the other 2 in long Join their ends
11. Now place a circle about 1 in in diameter on the right end of your longest line.
12. Complete your candle by adding a wick

Collect a few copies at random, pin them on the blackboard and permit the children to discuss them. One good copy should be included for comparison The children will relieve the teacher of any necessity for remarking upon the drawings, for they will quickly discover any faults. The teacher may find it necessary to draw attention to line work, as some children carrying out this kind of drawing hesitate and lack freedom.

XXXV. HANDWORK—A FOLDER BOOK

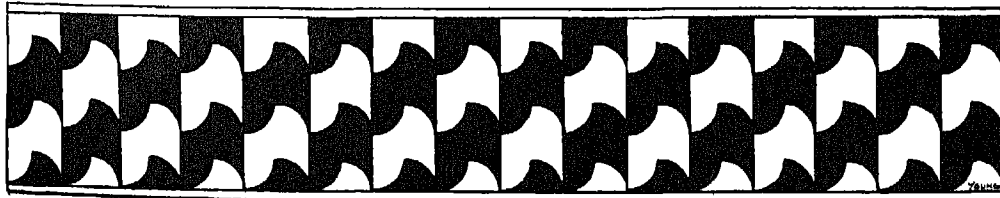
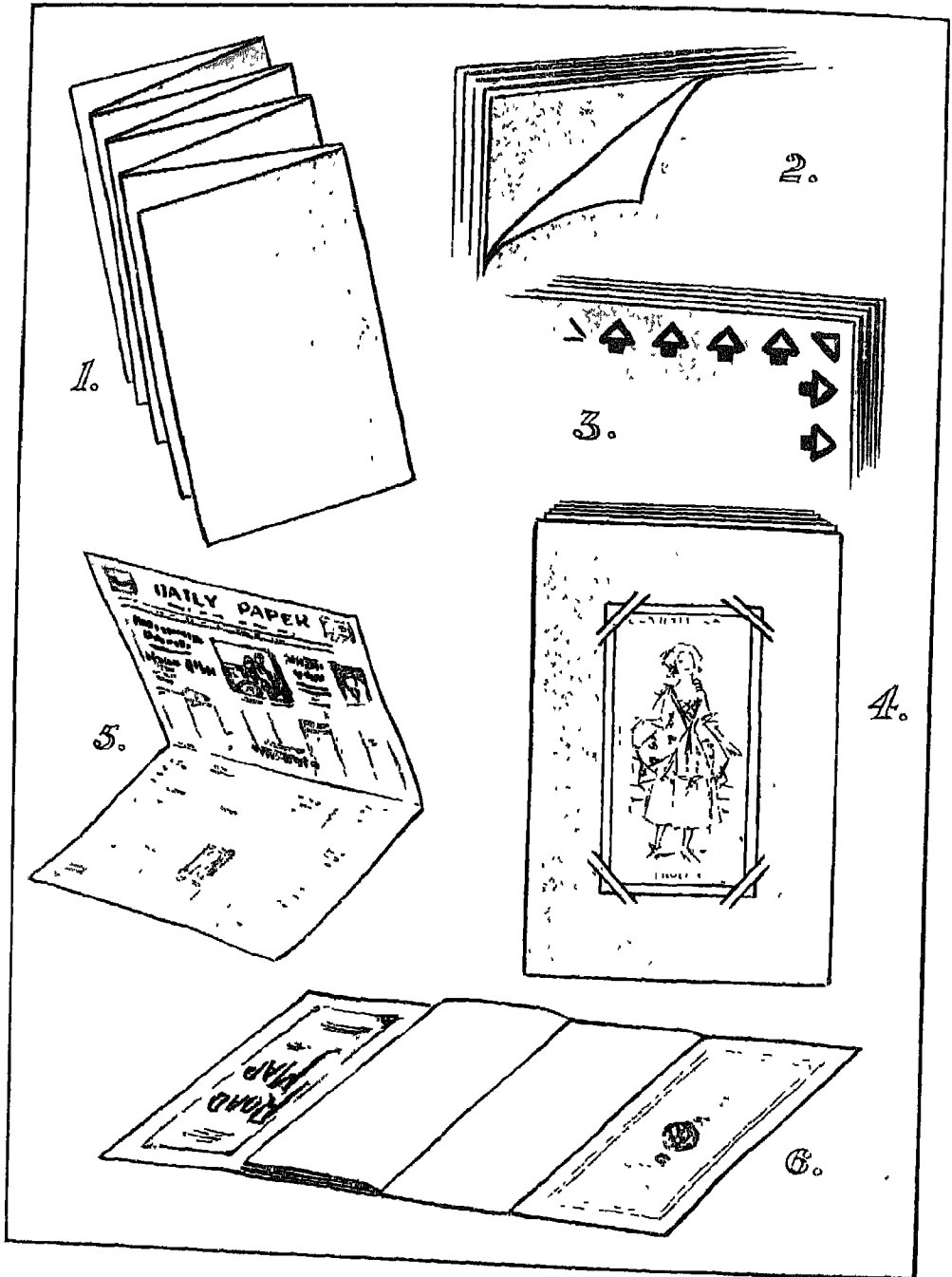
Introduction.—Sufficient practice has now been acquired to ensure a fair facility in handwork, and the children will be interested in adapting paper folding to make a book.

Exercise 1.—Provide each child with a strip of paper about 18 in long and 4 in. wide. Place this on the desk with its length lying from left to right Measure the paper into 3 in lengths both at the top and bottom, and by lines joining these points indicate where the creases will come Taking hold of the paper at the second crease from the left, fold it over and crease it down firmly and exactly over the left-hand edge of the paper. Fold the fourth crease over similarly and repeat with the sixth; this will leave the first and last folds free for lining.

Two pieces of cardboard will be required to make the covers. They should be 4½ in long and 3½ in. wide Cover the outer side of the card carefully with gummed coloured paper, bringing the folds neatly over to the inner side. Now mark ¼ in from all the corners of the inner side along both the length and the breadth, and join by neat lines parallel to the edges. This will give a rectangle exactly the size of the lining folds, which should now be carefully adjusted to this rectangle and fastened down. Adjust both cards in the same way, forming a front and back covering to the folder In the brushwork and pattern lesson the tinted cover can be decorated with suitable cut-outs This book will form a useful holder for small photographs, or a collection of cigarette cards, Figs 1, 2, 3 and 4.

Exercise 2.—Another useful folder can be made similar to the familiar road maps and town plans which are such a puzzle to open and close As a large piece of paper is required for this exercise, a newspaper page may be used The news sheet should lie on the desk with the headlines at the top. Taking hold of the top corners, the paper should be folded over to the bottom, creased across the middle and smoothed down with the ruler. Taking hold of the bottom corners, the sheet should now be folded again across the middle upwards This gives us a long strip of folded paper which in turn must now be folded from left to right Divide its length into eight equal rectangles divided by creasing lines. Fold number three crease over to fit number one (not the outside edge); number five to meet number three; and number seven to meet number five. The rectangles at the ends are free, and to these we must apply our covers. The title cover will be placed on the extreme left and must be fastened upside down. The back cover will be placed on the rectangle at the extreme right and will also be upside down In this way our folder will correspond with folder maps and plans, and as we open it the reading on the inside will be correctly placed, Figs 5 and 6.

The teacher will find it helpful to ask some of the children to repeat the method, using their folders to explain the process. An actual folder map shown to illustrate the lesson further would be useful at the end of this lesson, as a contrast to the method by investigation which has been used in previous exercises

PLATE XX

HANDWORK—A FOLDER BOOK

1 Paper Folder 2 Cover Lining 3 Cover Decoration. 4 Card Holder 5 Newspaper Folding 6 Folder Map

XXXVI. BRUSHWORK AND PATTERN MAKING

(Colour Plate No 162 A in the portfolio.)

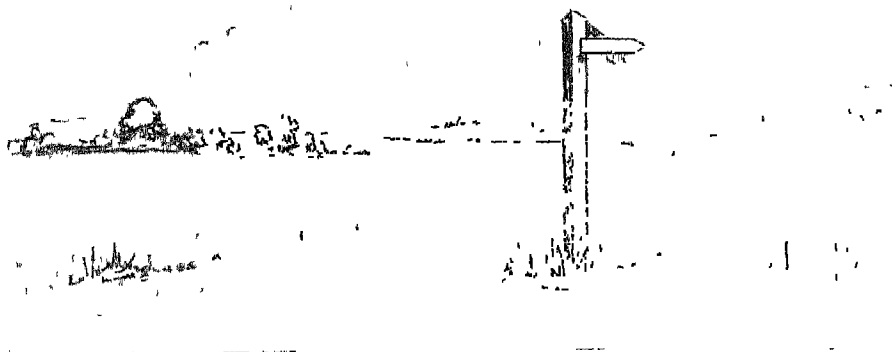
Introduction.—It is proposed to contmue the colour scale exercises in this lesson The pnmaries will be completed by constructing a scale of blue For the purpose of introducing this, blue papers will be required, and the usual apparatus for the brushwork lesson. Supply each child with the necessary blue (cobalt), and white and black colours These, if possible, should be good body colour If the usual water colours only are in use, strong colour must be used from which to make the scale The children will draw their inch squares (as before) on the left side of their book, the first one, K, being placed at the left centre, with squares above and below for tints and tones.

Exercise 1.—The children know how to make their first wash in square K by using the pure colour so that the square when finished exactly matches the paint on their palette. They can now proceed carefully to add a little white, and place a wash of the new tint in the next square above This can be continued until they have graded their colour to the lightest blue Brushes must now be well rinsed and cleansed with the rag This being done, they can proceed similarly to grade their tones or shades of blue by adding degrees of black. The scale should be lettered as before. (See Colour Plate)

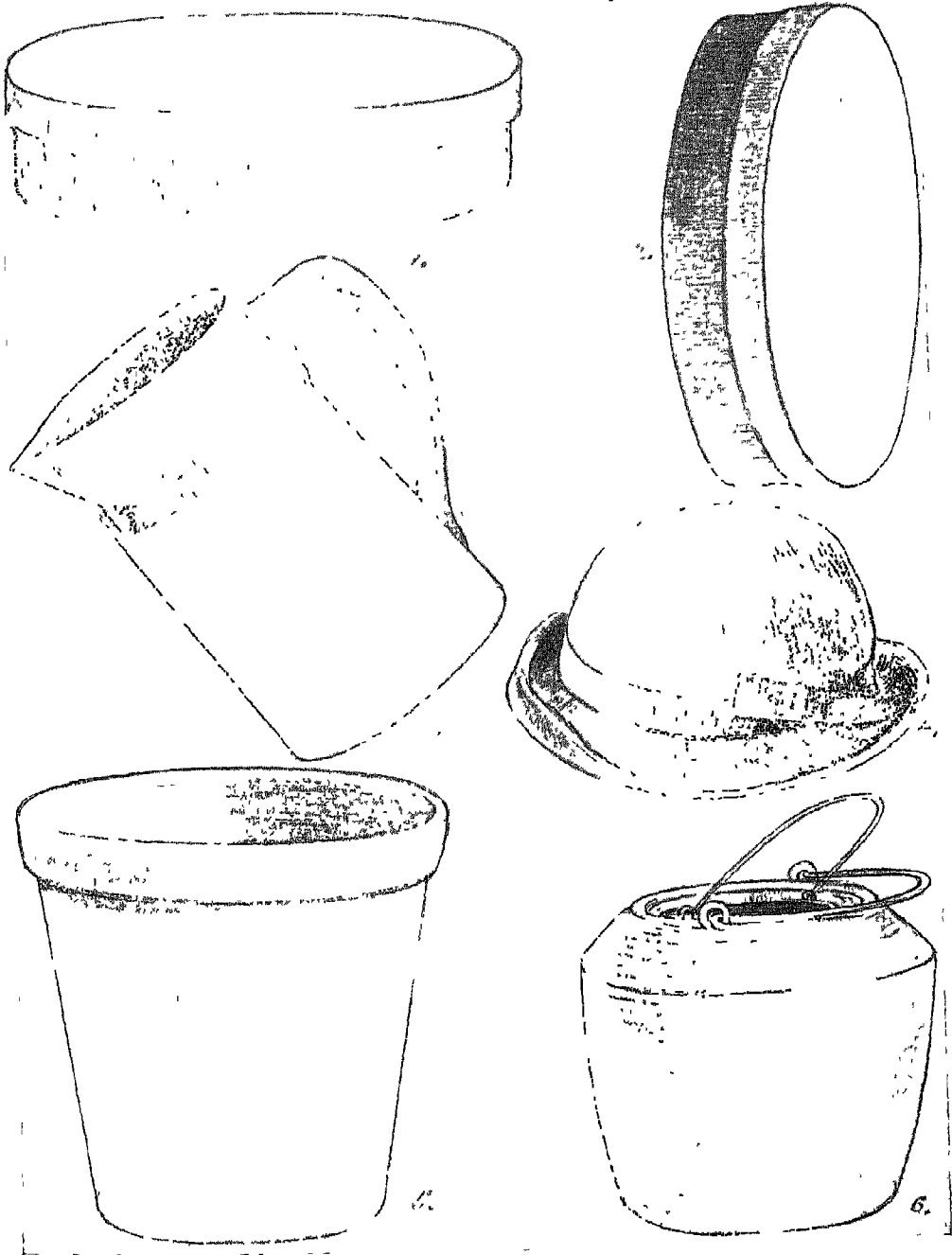
Exercise 2. *Oral work* —Display a few blue papers in turn, asking the children to choose from their scale the tint or tone which corresponds to that of the paper shown. Enquire which letter of the scale is the clue. This is necessary in order to find to what extent colour selection is really developing The selection of colour can be further exercised by the use of a few well-known blue objects which can be shown to the class, e g a girl's dress, a boy's tie; or articles such as a sugar bag, a skein of light blue wool, or a teacher's marking pencil The class can spend a short time choosing their scale colour which matches the article displayed In this way, a good habit of colour selection will be formed. The children will naturally be receiving colour perceptions in the home and in the street from the stimulus given by these exercises, and the colour scale will become part of their mental equipment.

Exercise 3.—Some dark blue gummed papers should now be distributed to the children, who are to cut them into strips about ½ in wide These can be cut into small squares by the process of folding Now on their books let the children prepare an oblong (4 in by 2 in) and fill it with a wash of pale blue, corresponding to one of the tints in their scale Instruct them to use their water freely and to apply the wash in level strokes from left to right, beginning at the top, and working the colour evenly to the bottom right-hand corner, where the surplus water and colour can be taken up with a dried brush. When the surface has dried, the children should take their paper cut-outs and arrange them in trial patterns until they find one that satisfies their sense of orderly arrangement, Fig 4 Tell them that the light blue ground must take its part in making the pattern. The cut-outs can now be fastened down. With the remaining cut-outs, the children can devise a border scheme or other pattern as their ingenuity dictates.

SECOND YEAR'S COURSE OF DRAWING AND HANDWORK

I. ELLIPSE SHAPES—PENCIL

THE CROSS ROADS

Introduction.—The drawing lessons at the beginning of a new year must be carefully considered, especially if the class passes into the hands of a new teacher It is most important to secure continuity of work, and the teacher is advised to become acquainted with the course as a whole, for the scheme is synthetic The work of the previous year should be known, reference should be made to the children's drawing books and to the syllabus of work accomplished during the year. This survey should always be available to the teacher, and some examples of the children's past work should be kept. The colour scales which were introduced into the brushwork section will be needed throughout the course, and may be collected and exhibited to illustrate colour values at a later stage. Only in this way can the course become effective as a valuable scheme of instruction.

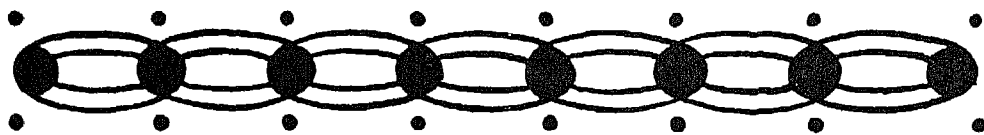
Preparatory.—The teacher should provide a cylinder of cardboard or metal covered with coloured paper, and with its ends covered with paper of a different colour Test the children's knowledge of the ellipse shape as the cylinder is raised or lowered Then let the children observe the ellipse while the cylinder is revolved in an upright position Next show the end of the cylinder to the class A few will see it as a circle, while those on the left and right of the teacher will see it as an ellipse Why? It is not always because the circle is moved that we see an ellipse, but sometimes because we have ourselves moved so that we obtain a side view. Children do not always perceive this difference, and with the aid of the coloured disc this new perception is made clear to them They may suggest other examples such as running hoops, wheels, a garden roller and a big drum.

ELLIPSE SHAPES—PENCIL

1 Toffee Tin. 2 Toffee Tin in upright position 3. Hanging Jug 4 Girl's Hat.
5 Flower Pot 6 Glue Pot

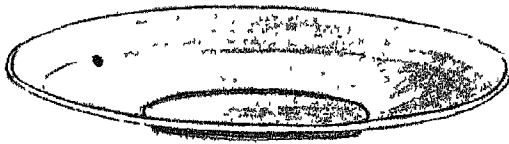
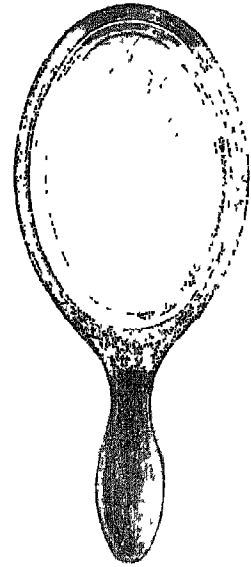
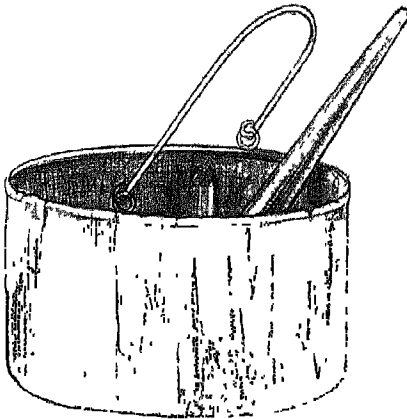
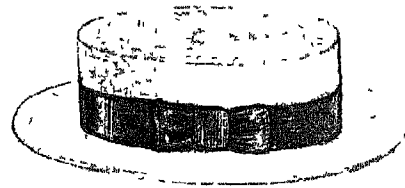
Exercise 1.—A circular toffee tin placed against a white background will make a suitable object for the class to draw Show it first standing on its base, Fig 1, and let the children plan its proportions by upright lines to indicate its height and width. Now they can draw in the colour shape of the top. Even if the colour is the same all over the tin shape, the top will present a lighter tint which will enable the children to distinguish its shape. A similar curve for the base ellipse will suffice at this stage. The lid line, which suggests yet another ellipse, will make the representation complete This drawing should not be too large, and should be drawn quickly Now give the view of the tin with the ellipses vertical, Fig. 2. The tin should be placed upright in front of the class, as in an inclined position the object is too difficult for the children to draw at this stage

Exercise 2.—A jug of simple outline is chosen for the next exercise, and it is suspended as it would be seen on the kitchen dresser, Fig 3 Show the cylinder in the sloping position, and by questions educe from the class the fact that the ends keep the same position with regard to the body of the cylinder—that the ellipse shape appears exactly the same but in a sloping position They can draw the sloping lines indicating the proportions of the jug, afterwards adding the ellipse shape as it appears to them Details such as the lip and handle can be added, the children observing that one is opposite the other. The handle will present a difficulty, but that will be dealt with in a later lesson

Other objects suggested for this lesson are coloured saucepans, a glue pot, a flower pot, a jam jar, a hat and a tambourine.

II. ELLIPSE SHAPES—PENCIL

ELLIPSES

Preparatory.—The preparatory work for this lesson consists of an exercise for the memory by using the "shut-eye" method Pin a large paper ellipse to the blackboard, tell the children to close one eye, to point at the edge of the ellipse with their pencils, and slowly trace its shape in the air several times. With both eyes closed let them repeat this movement just above the surface of their paper, gradually bringing the pencil in contact with the paper when they have caught the swing and "feel" the shape At first their efforts will produce only freedom of line—which is useful—but after a few attempts good ellipse shapes will be drawn Now, with eyes opened, let them draw an ellipse below their first efforts Having had previous exercises of the kind in pastel, good ellipse shapes should soon result without the mechanical aid of axes.

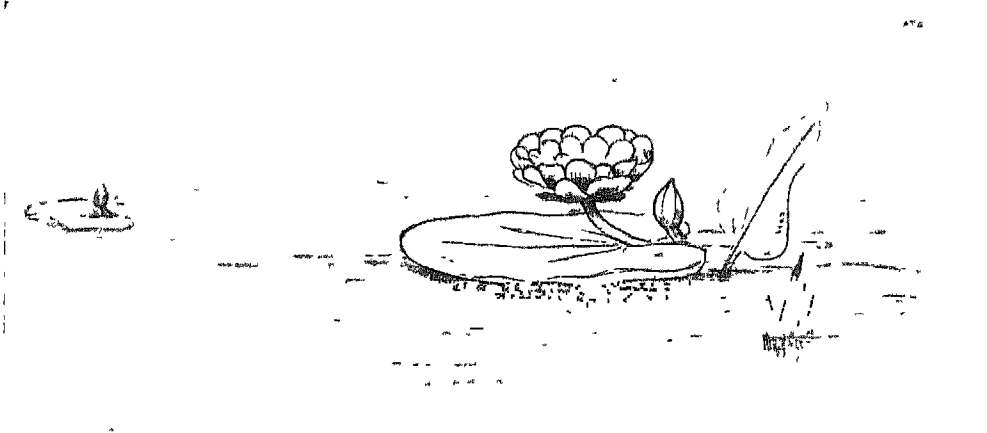
Oral.—In order to explain the reasons for the elliptical shape, the teacher should prepare a girl's hoop by fastening coloured cords or ribbons to it in the positions of upright and level diameters. The hoop

ELLIPSE SHAPES—PENCIL

1. Plate 2 Hand Glass 3 Paint Can 4. Candlestick. 5 Basin 6 Straw Hat

should be shown to the class and questions should be asked as to the relative lengths of the coloured cords when the hoop is facing the class in an upright position Then with hands at the extremities of the level diameter, slowly revolve the hoop inwards while the children watch the coloured cords What happens to the level cord? Nothing. What happens to the upright cord? It becomes shorter in appearance. Now revolve the hoop outwards. The children will notice the same effect Impress on the children's minds the fact that the circle shape produces the ellipse. Now repeat the experiment with the hoop held in an upright position and note similar results Further, take the cylindrical tin or cardboard box which was covered with coloured paper, and show the class the end view. Then stand it where the children can see a little of its top. What does the yellow disc look like now? Ask for the names of any things that present this shape to us In almost every case the children will notice that the slanted circle gives us this ellipse shape It is important to impress this perception thoroughly, as it will tend to remove the commonest fault in the drawing of ellipses

Hoop with Axes of Coloured Ribbons

Exercises.—The first object to be drawn should be definitely of an ellipse shape, and may take the form of an elliptical mirror, a photograph frame or a hand glass. The drawings should not be too large, and the ellipse should be drawn freely, after the manner of the memory exercise.

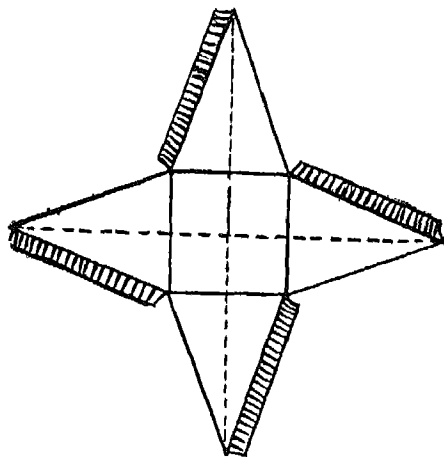
Other exercises will be readily found The following is a list of objects from which the teacher can choose—large plate, flower pot, basin, drum, bowl, toy bucket, candlestick, paint can, lamp shade and straw hat In the case of cylindrical objects the upright lines suggesting proportion should be drawn in first and the ellipses added afterwards.

Ellipses—The Water Lily

III. BRUSHWORK

(Colour Plate No 162 B in the portfolio)

PYRAMIDS

Introduction.—The aid rendered by the use of colour to the perception of shape and form as shown in other sections of this course must be used to the fullest extent, and the following lesson is arranged with this purpose in view Careful paper-folding and colour application are used to aid colour choice and the recognition of new shapes. The value of this training should be revealed in later objective drawing

Preparatory handwork.—Scissors and stiff plain paper about 6 in. square should be distributed for the construction of the model of a square pyramid Draw on the blackboard the shape from which it is developed or, better still, construct a large copy, working with the class Let the children draw a 1½ in square in the middle of their papers and mark the centre of each side of the square They can now join the opposite points and extend the lines in each direction beyond the square for 2 in. The ends of these lines should be joined to the corners of the square. This adds a triangle to each side On the left side of each triangle draw a flange, about ¼ in. wide Now cut round the entire shape—including the

HOW TO MAKE A PYRAMID

flanges—and fold upwards carefully along the pencilled lines of the flanges and of the square; each fold should be cleanly pressed Now raise the triangles from each side of the square, their points meeting over its centre, and fasten each of the flanges to the inside of the nearest triangle This requires care and patience, but if the paper is firm, it can be nicely done Snip off the ends of the flanges at the point of the pyramid, and so make all edges neat When dry, this should give each child a firm model of a pyramid.

Exercise 1.—Supply alternate children with light red or chrome yellow colour This is to be used as a self colour and applied as such. Tell the children to see that their brushes are clean, and then take up their pure colour on a wet brush and apply it to the triangular faces of the model pyramids The model should be held firmly down by its point. The colour must be applied evenly on each side. The base can be left for the present. We have now a series of red and yellow pyramids It would be well if the teacher has also prepared a large copy to be seen by the class

Exercise 2.—The children who have the red model can find the scale of reds in their drawing books, and may be invited to look at the teacher's model, which should be displayed in a good light. Now point to one of the triangular faces of the teacher's pyramid and ask the children who can see it to select that colour in their scale. Next point to another side, and let the children who can see that side find the colour on their scale. Now the children will be eager to test their own pyramids They may choose the colours in the scale which seem to agree with the triangles they see, and they can mark them K or *a*, or B, as required Similarly, the children with yellow pyramids can find the scale of yellows and choose their colour values. Explanations will soon be required as to why the red or yellow which they painted from the same colour now appears lighter in one triangle and darker in another Let the children give their pyramids a turn, and see whether it happens again.

IV. PASTEL DRAWING

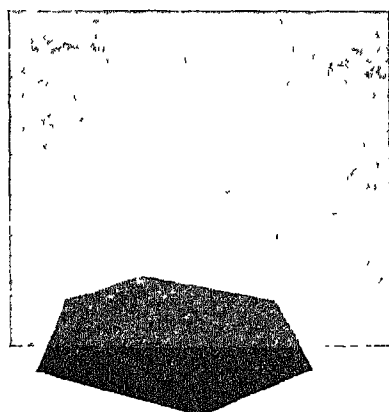
(Colour Plate No 163 D in the portfolio)

Introduction.—In the previous lesson the children prepared and coloured models of the square pyramid Distribute these and ask the children a few questions on the reasons for constructing and colouring them. They will remember that the light falling upon these pyramids gave definite colour shapes. The children should be asked to look for these shapes again and note the effect of the light directed upon them By a few questions their perceptions will be greatly assisted. What are these shapes? Are they exactly alike? Where do they meet? Where does the point of the pyramid appear to be? The teacher should have a large copy of the model before the class, and refer the questions to that This model should have a red face next to a yellow face so that the colour shapes are clearly defined against a background similar to the paper used by the class

Exercise 1.—In the top half of the paper let the children draw their view of the red triangle on the teacher's model and against that draw the yellow triangle Their previous

exercise in colour shapes with the model will assist them to render the drawing correctly The chief fault will be the position of the apex This can be corrected if a few faulty drawings are pinned on the blackboard and compared with the large model In a short time the children will read the shapes correctly and produce good copies

Exercise 2.—For further practice in reading and rendering these shapes, an inkstand with a blotter standing behind it is suggested. The inkstand in the Colour Plate is a truncated pyramid, and the blotter has triangles of leather at the corners of the rectangle, the paper being octagonal in shape and pink in colour The children should not find much difficulty added to their previous exercise by this simple combination of objects. The blotter forms an excellent background from which the inkstand blocks out a definite shape; and if the stand is placed upon pastel paper, that too cuts out a shape, and by the aid of these the drawing is rendered easy If light red is placed round the shape to represent the blotting paper which forms the background, leaving a border and brown triangular flaps, the colour of the inkstand treated according to its lighting will produce a good representation of the model, Fig 1.

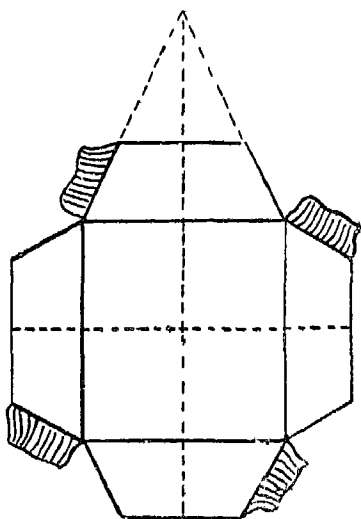
Other objects suitable for this lesson are a large weight, a wedge of cheese, a wooden mallet and a packet of chocolate, Figs. 2, 3, 4, 5 Another useful object for this lesson is the lampshade on Colour Plate 162 B

COLOUR SHAPES

V. HANDWORK AND COLOUR

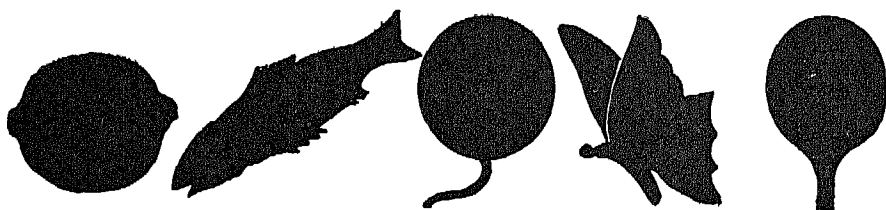
(Colour Plate No 166 A in the portfolio.)

Introduction.—Provide the children with the usual requisites for cutting out, and include coloured gummed paper. Cardboard should take the place of paper if possible, but if paper is used it should be stiff in character and tinted. It is proposed to make and decorate a trinket box.

Exercise 1.—The construction is similar to that of the square pyramid The base should be 3 in square and the triangle drawn on one side only, about 5 in. in height Mark 2 in on this height line and draw a line parallel to the side. Repeat the shape on the other sides and add flaps for fastening. (See accompanying diagram) Cut the lid from cardboard the same size as the base. Place it evenly on the top of the finished model so that the overlap is equal all round When in position draw a pencil line on the underside of the lid where it meets the box This is the hinge line A piece of folded Duxeen or strong paper, well glued, will make a suitable hinge, Figs 1a and 1b on the Colour Plate.

Exercise 2.—The trinket box should be made of tinted paper or brightly coloured

PLAN OF A TRINKET BOX

with either a simple wash or gummed paper In this way it becomes a suitable object for decoration Now ask the children to choose coloured papers which will make a colour scheme to harmonise with the tint of the box From these papers the children will devise cut-outs with which to decorate the box. By folding and cutting they can make many cut-outs in a short time. These should vary in shape, and it is not necessary that they should always be geometrical. Interesting and effective pattern work may be made from cut-outs of common objects in silhouette. The children should be permitted to invent their own patterns and so express their own ideas of decoration It will be necessary to point out that the arrangement must be orderly, and that use must be made of the background in the pattern It is important to secure good finish to work of this kind, not only to give the model a pleasing appearance, but in order to train the children to finish their work carefully in preparation for bookbinding at a later stage To this end the inside of the box and the underside of the lid should be lined neatly, and all traces of joints, glue, etc., should be hidden, Fig. 1

Models of lampshades, trays and flower-pot stands can be constructed and decorated in a similar manner to provide further exercises, Figs 2, 3 and 4

CUT-OUTS FOR DECORATIVE PURPOSES

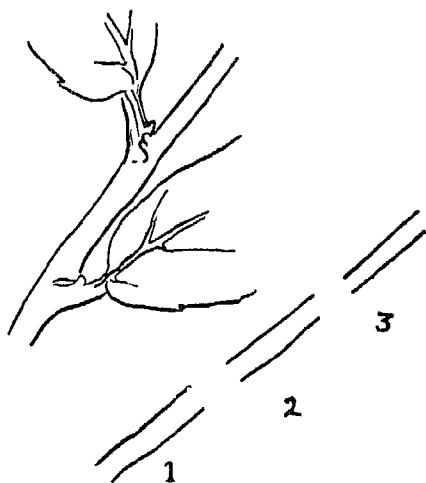
VI. DRAWING FROM NATURE—PENCIL

Introduction.—In our last lesson on nature drawing the subject of a spray of two or three leaves was broadly treated, only the general shape and position of the leaves and leaf spaces were considered It is now necessary to give attention to the details which call for closer observation These include joinings, the nature of the leaf edge, the lobes, and the shape and nature of the stem and twig

Exercise 1.—Supply the children with simple sprays of a large laurel; two leaves and a portion of stem will be sufficient for

each child, Fig. 1 on the Plate, page 90. The children will remember how to plan the spray This will be done to resemble the main lines of the spray as it lies near them. The shape and position of the leaves should now be indicated Ask the children to describe the stem It is smooth but not quite continuous or straight It is connected by a series of lengths (or nodes) between the leaf joints; these lengths thicken slightly where the leaf breaks out of the stem. The joint of the leaf is above this thickening. The leaf is shown breaking out of the body of the stem, and never otherwise The children can now draw the stem and indicate the leaf joint This will need repeated observation and practice. Between the leaf joint and the stem a tiny bud is usually found.

The leaf edge should now be examined, though apparently straight it contains a series of slight notches The leaf base is about $\frac{1}{2}$ in from the stem, and at this point the leaf edge slightly rolls out of the midrib. The veins are about ten in number and are placed alternately All these observations should be made by the children.

BEECH LEAF

STEM OF THE LAUREL

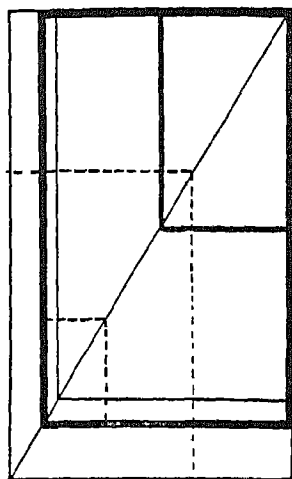
Exercise 2.—A spray of beech or lilac will make a good supplementary exercise, Fig. 4 on the Plate, page 90. The stem in this case is shown clearly in short lengths, and the leaf formation is simple and interesting. The leaf edge shows a series of notches corresponding to the number of veins curving from the midrib to the leaf edge. The spray will be planned as usual, and the position of the leaf shapes and space shapes carefully indicated These characteristics are important, and time and attention are necessary to observe them correctly. With this accomplished, the children can attempt to express the detail as they find it.

Other examples of sprays which are easily available are laurustinus, bay, holly, sweet chestnut and rose.

VII. HANDWORK—A BLOTTER CASE

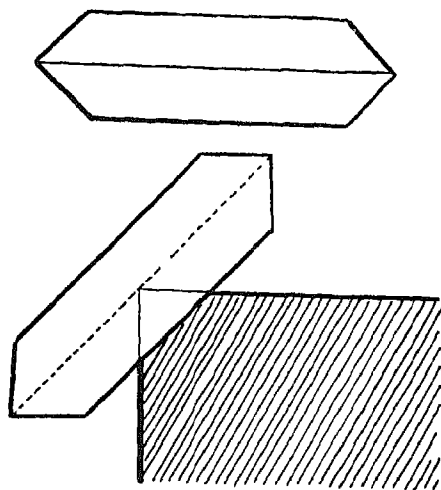
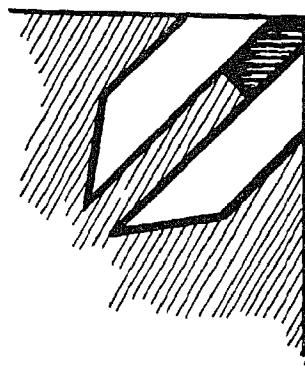
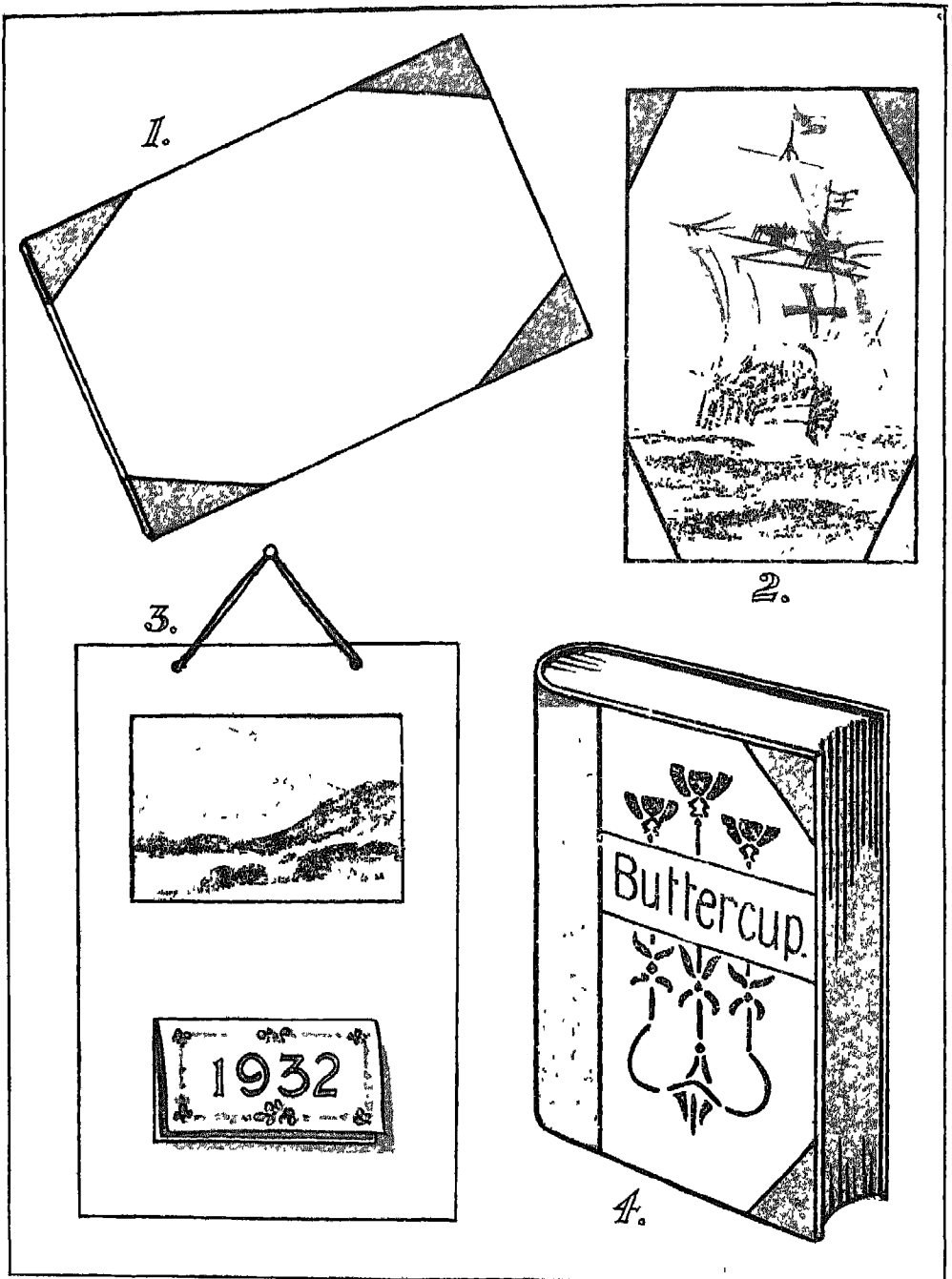
Introduction.—Distribute large sheets of fairly stiff paper with cutting out materials Let the children draw a rectangle measuring 5 in by 3 in. These measurements are chosen as being a standard of proportion for rectangles of pleasing and satisfying shape The children should remember this size, for it will be useful for many purposes

Drawing from Nature—Pencil

1. Laurel 2 Holly 3 Rose 4 Lilac

How To Draw
Proportional Rectangles

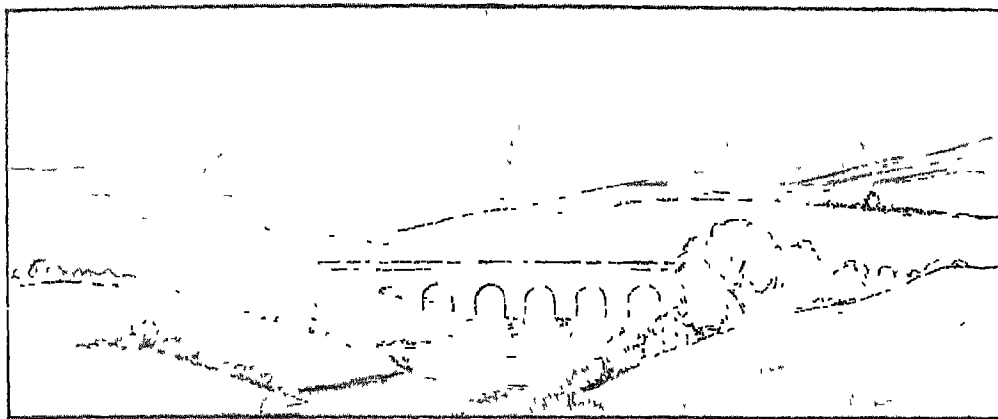
Binding a Corner

in the course Draw a line across the rectangle from corner to corner This line also is important as upon it are to be found points from which to reduce or enlarge the rectangle in order to give the size required for our object Take any point on a long side of the rectangle Draw a level line from that point to the sloping line, and from the point on this line draw an upright line to the base. Here is a new and smaller rectangle Try several points, some in the opposite direction (see dotted lines) If we extend our sloping line and also the side lines, we can make large rectangles of proportional shape.

Exercise 1.—The children may now construct a blotter case from a sheet of cardboard. In the middle of the cardboard draw lightly the key rectangle 5 in by 3 in., with a cross line to the corners. Enlarge this rectangle by making a long side 7 in in length and constructing the rectangle by the method set out above Cut out this rectangle. Corner bindings will next be made by cutting four strips of Duxeen or strong tinted paper about 4 in. long and 1½ in wide Trim the ends as shown in the accompanying diagram Draw a dotted line along the strip from point to point to show where it is to be folded Place the strip across the corner of the rectangle so that its centre is on the point of the card and the trimmed edges lie in line with the sides of the card Fold the strip along the middle line to enclose the corner and tuck the ends back neatly so that they lie parallel to each other at the back of the card Keep these in position and fasten them securely The back will appear like the diagram shown Repeat this for each corner Cut out a piece of clean paper and paste it neatly to the back to cover the binding work Insert a piece of blotting paper in the front. The corners can be decorated with a simple pattern if desired Further exercises on the practical use and application of rectangular shapes are shown in Plate XXIV, page 92.

Back of Binding Strips

HANDWORK—A BLOTTER CASE, ETC

1 Blotter 2 Mounted Picture 3 Calendar. 4 Decorated Book Cover

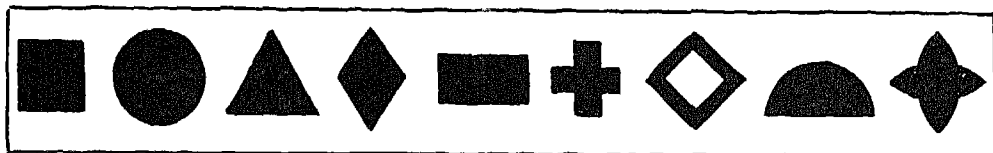
VIII. BRUSHWORK AND PATTERN MAKING

(Colour Plate No 163 A in the portfolio)

Introduction.—The primary colours having been introduced and taught in the first section of the course, the teacher can now add the secondaries to the instruction on brushwork Further practice with the primaries will be maintained in order to ensure truthful selection, and in this work the recognition of the different reds, blues and yellows will be necessary. The teacher will therefore need to be well provided with a series of coloured papers to illustrate these varieties It is not intended to produce subtle tints or tones, but to teach the general principle of colour blending, and this may be done largely by the children's own experiments It is important that mechanical monotony should be avoided, and that the spirit of interest and adventure should direct the efforts of the children.

Exercise 1.—Good primary colours (crimson lake or light red, cobalt and chrome yellow) in either body colour or ordinary water colour having been supplied with other necessary equipment, the children can damp the top part of their paper with clean water, and place a strong, irregular, but small patch of blue on its surface The brushes should then be rinsed, and a similar patch of crimson lake or light red placed near it, to one side Below these, forming a triangle, should be placed a patch of chrome yellow The children may now take up clear water on their brushes and work the edges of the colours towards one another, spreading the colour outwards They should let the blue merge into the yellow, the red into the blue, and the red into the yellow. With water freely used, let them thin the resulting colours out towards the bottom of their moist surface, and they will have produced the secondary colours, orange, green and violet, with graded tints In this way they have discovered what can be done with colour blending and will be prepared to make further experiments for definite purposes The teacher must be prepared for some untidy results, but these

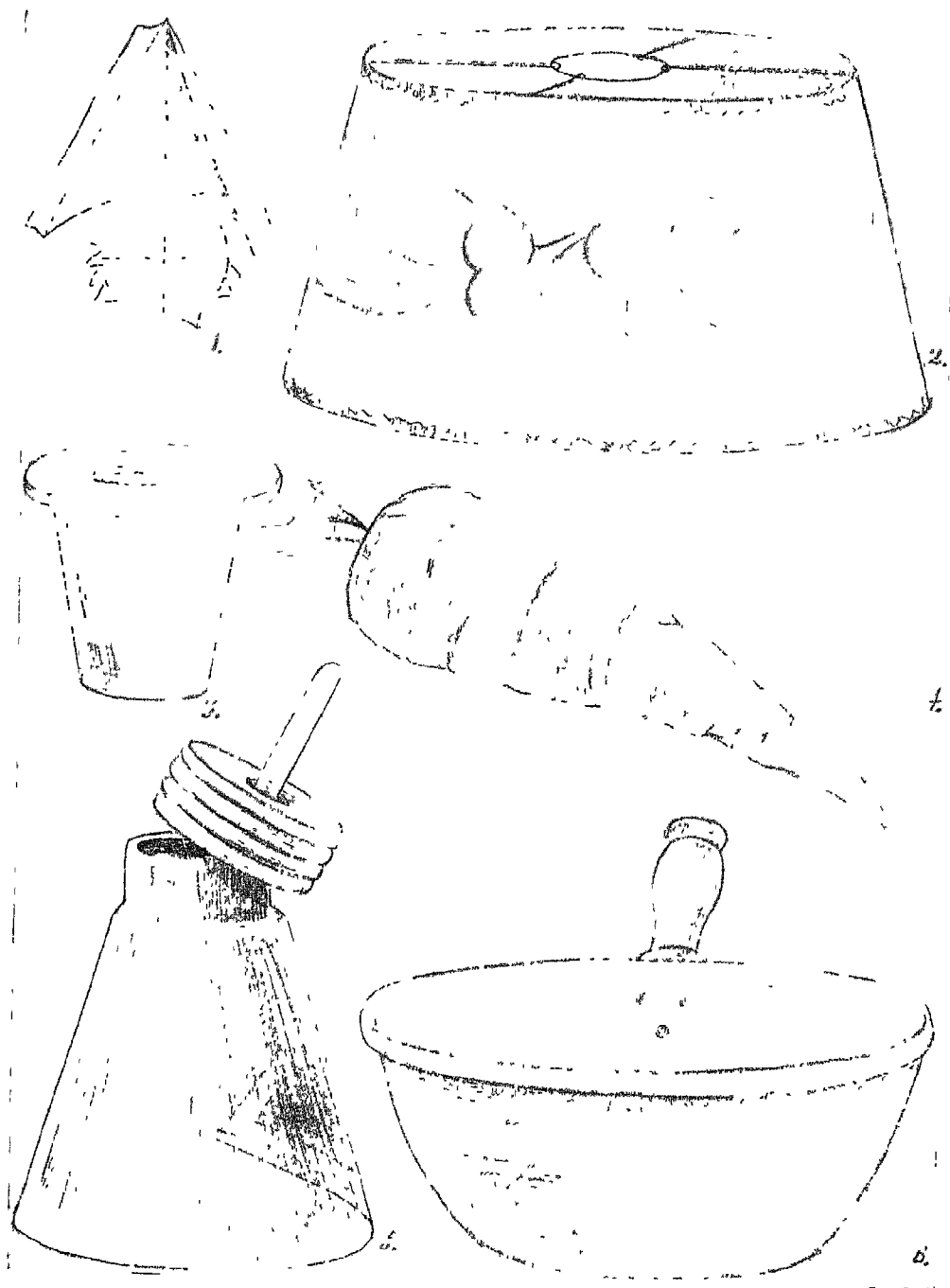
are soon overcome if the children make good use of clear water and spread their pairs of primaries freely.

Exercise 2.—This will take the form of a memory exercise which will enable the children to express their perceptions of colour without any serious effort of drawing The only aid suggested is that the teacher should show the children some red papers and tell them they are going to paint a pillar box and a red tulip The papers are intended to assist the children to make their mental selection of the particular colour required They can be allowed to work out their own scheme in flat colour, and use their black and white—as in previous exercises—to produce additional effects The experiment just made in Exercise 1 will encourage the children to paint in the stem of the tulip. This can safely be permitted, but the leaves should not be attempted at this stage. The drawings should be on a small scale, and, as much as possible, the colour should be applied directly, Figs 2 and 3

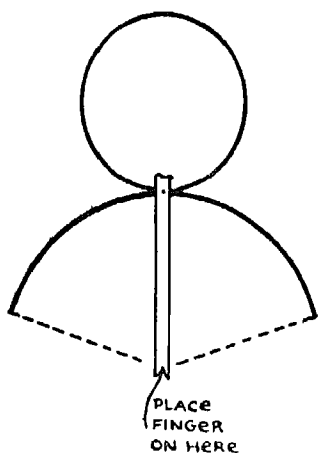
Art occupation.—As a simple and interesting exercise the children can make a pattern using potato cuts for stamping their unit, Fig 4 An oblong background should be washed in with orange colour This can be prepared by reference to their exercise on blending. While the background is drying, let the children prepare potato cuts Give a small portion of potato to each child, who will cut a small block from it. At one end of this block cut a simple shape which can be used as a stamp With a fairly dry brush, take up some blue body colour and lightly cover the stamp with it Try the effect on a piece of blotting paper, and when the colour is well absorbed by the stamp, the children can apply their unit in orderly arrangement on their prepared orange background. An alternative plan is to place the colour on felt and press the stamp into that, and then to the pattern. It is important for the cut-outs to be very simple—as shown below It may be thought that the preparation for such an exercise is cumbrous, but it has been proved that the quickness of producing a pleasing pattern repays the trouble of having cuts prepared and the waste collected. The children, too, will adapt this easy and attractive method to their art occupations at home

Cut-outs for Decorative Purposes

IX. CONICAL SHAPES—PENCIL

Introduction.—During the course we must gradually pass from the consideration of flat shapes to objects of three dimensions In the pastel lesson this has already been suggested by the reading and rendering of colour shapes. It should now be possible for the children to approach the drawing of objects with three dimensions, if the objects chosen are of such a nature that definite shapes are presented to the eye Many conical objects meet this requirement, and while presenting clearly defined shapes, suggest to the observant child the main lines of structure and give hints for the line representation of new planes in the drawing

Plate XXV

Conical Shapes—Pencil

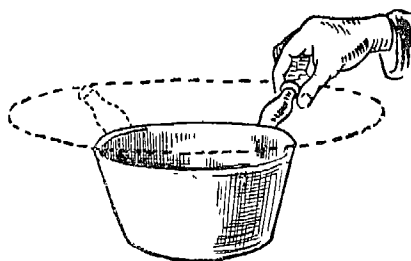
1 Development of Cone 2 Lamp Shade 3 Inkwell 4 Parsnip. 5 Gloy Bottle 6 Hand Bowl

Preparatory handwork.—With a cardboard disc and a strip of paper, the children can be shown how to draw the development of the cone. Tell them to draw a vertical line at the top part of their drawing page, to place the disc so that it projects equally on each side of the line, and to draw a circle round it. They must now make a hole in one end of the strip of paper and pass a pencil point through the hole Lay the strip on the drawing page so that it lies along the vertical line below the circle, with the point of the pencil touching the ring of the circle. Place a finger on the lower end of the strip and describe a curve by revolving the strip first to the left and then to the right.

How to Make a Cone

The children must now measure the circumference of the circle along the curve in the following manner Remove the strip and take up the disc shape (which is the same size as the circle). Lay the disc over the circle and mark the two points on the circumference of the disc where the vertical line crosses it Pick up the disc, keeping the lower point in position, and roll it along the larger curve, hoop-fashion, till the second mark touches the curve Mark this point on the curve. Replace the disc in the original position and give it a similar half-roll to the right, and mark on the curve the point where the top of the disc meets it, as before. The distance between these two marks on the curve equals the distance round the circle.

Join these marks to the point where the finger rested Triangular flaps should be placed on one of the slanting lines and also on the circle (See Fig 1, Plate XXV.) After folding and gumming neatly we have a cone that will help in the drawing of many new objects. The cone should be painted with a bright colour, and its base with a different one. The children will remember objects that resemble or partly resemble this shape, and can suggest some of these to the teacher

Exercise 1.—Our first drawing suggested by the cone shape is easy to draw because its surface is irregular. It is a large parsnip lying on the desk, Fig 4. Let the children place their model in the same position and they will observe how much of the coloured base they see, and the shape and direction of the body. Now they can note where the parsnip is like and where unlike the model. They can show with light lines the general shape of the body and place the ellipse end afterwards Having obtained its outline let them add the lines which are characteristic of its texture As an alternative drawing the parsnip could be suspended vertically.

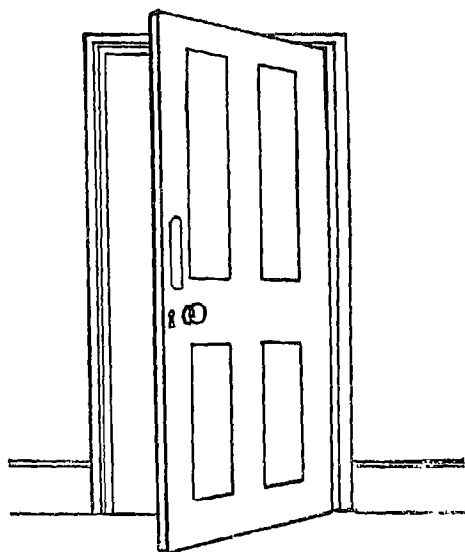
Exercise 2.—A hand bowl—a coloured one, if possible—can be used for the next example, Fig 6. The sloping lines can be quickly drawn to suggest the proportion of the

The Handle of a Bowl Revolving in an Ellipse

body To these will be added the ellipse shape indicated by the top of the bowl, and the front part of another ellipse for its base The handle will present difficulty on account of its position Slowly revolve the bowl by the end of the handle, showing that it always points to the centre of the bowl The children will notice that the handle end moves in an elliptical shape above the bowl and that its position is easily set down from that curve.

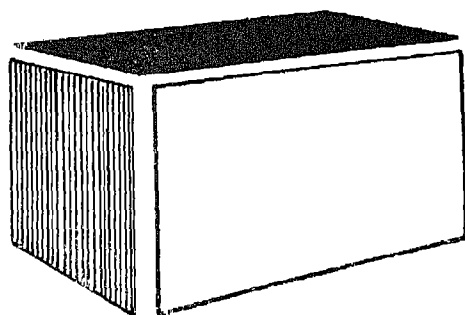
Other objects which can be used are a Gloy bottle, circular lampshade, school hand bell, inkwell, filter and oil can.

X. PASTEL AND IMAGINATIVE DRAWING

(Colour Plate 164 C in the portfolio.)

Introduction.—In the last pastel lesson of the first year's course, thickness was rendered by triangular shapes, and it is now proposed to advance to the representation of rectangular shapes when foreshortened For this purpose, cover a large piece of cardboard with red wallpaper, and in the middle mark out a rectangular door This should be cut on three sides and coloured blue Place the model in front of a yellow background This will give three definite colour shapes—red, blue and yellow

AN OPEN DOOR

Exercise 1.—Stand the model in view of the class With their charcoal let the pupils indicate the widths of colour which they see—the widths of red, a strip of blue and a strip of yellow. Through these points draw upright lines to indicate the shapes and then fill in the colours The children will not all have the same view, but the same method can be applied Details in the door can be added afterwards Show the children that the door fits the rectangular shape, but its new shape is caused by its sloping position when opened, Fig. 1.

Exercise 2.—A very helpful exercise can be given by the use of a rectangular block which has yellow paper stuck on the top, red on the ends and blue on the sides Here three definite colour shapes are seen. Before

RECTANGULAR BOX COVERED WITH COLOURED PAPER

drawing the model the children should experiment in making the shapes at the side of their papers It will be found that with a little practice the difficulty of drawing this common shape will be largely overcome The top—which children know to be a rectangle—is now seen to become a new shape owing to its position. Instead of a rectangle rearing itself up, they will see and draw a thin yellow shape which meets the red and blue shapes Having tried the shapes, they may now put them together and so represent the model, Fig 2

Other suitable models are a carton, Red Cross box and parcel, Figs 3, 4 and 5

Imaginative Drawing.—The following are useful exercises Let the children select one and represent the scene with their pastels

1. You are looking down a long country road lined with telegraph poles and a man is walking on the road in the distance
2. Have you looked through a tunnel? Draw what you have seen
3. Three fishing boats are returning to shore, one has arrived, another will be in soon, but the third will be a long time in arriving
4. A man is carrying some air balloons, but the wind is blowing them away, only two are left.

Much useful information will be supplied to the teacher by the attempts made by the children This is not an exercise on foreshortening, but rather one of research to discover what the pupils have "seen" with their minds

Imaginative Drawing

XI. DRAWING FROM MEMORY—PASTEL

Exercise 1.—This is to be an exercise in pastel drawing of the "shut eye" type of memory work. Make a large coloured disc—wallpaper pasted on to a circle of cardboard, or some coloured fabric pinned round a small hoop. Let the children see the disc as a coloured circle Now slant the disc, showing an ellipse to the children Ask them to close one eye, point their charcoal at the ellipse curve, and slowly trace its shape in the air Repeat this more quickly. Now let them close their eyes and trace the shape over their paper, gradually bringing the charcoal to the paper and drawing the shape. Afterwards fill in the shape with the required colour.

Exercise 2.—Slant the hoop again, this time presenting a narrower ellipse to the class Repeat the process of the first exercise, requiring the second drawing to be placed immediately below the first

Exercise 3.—In this exercise change the method Keep the hoop level so that the class can look down on the shape Repeat the tracing method round the shape and then over the paper, but with the eyes open Now draw in the shape and fill it with colour

These exercises will not take more than fifteen minutes and the children should be asked to compare the three drawings.

Memory drawing in colour.—This lesson can be concluded by a direct exercise to test the children's memory of colour. Choose some object of uniform colour and ask the children to draw it from memory. A flower pot or a Bovril bottle is suggested, as either will test both the colour perception and the memory of the shapes dealt with in recent lessons This exercise is not, however, to be considered in the nature of a test, and it should not be criticised by the teacher, whose chief interest will be in noting the amount of past observation expressed by the results

XII. DRAWING FROM NATURE—CLAY AND PENCIL

Preparatory handwork.—Provide each child with a fairly large twig The twigs may vary in kind, but should not be taken from fruit trees, such as plum, apple or pear, as the texture of these is too complex The twigs must have at least two or three nodes with joints leading to leaf stems Distribute clay and pointing sticks with which the children are to make a copy of the specimen in clay Ask the class carefully to examine the specimen, noting firstly its general direction and build.

Exercise 1.—With the clay the children may build up the stem of two or three lengths corresponding to the nodes seen These must be arranged to follow the whole shape of the twig, and be joined together At the junction of the lengths the joint will be found. To form these joints note the slight thickening of the twig towards this point The children will observe whether the leaves spring from one or both sides of the twig. In modelling, this must be carefully expressed. The joints should be faithfully

copied and the stem attached separately with a properly shaped junction Now with the pointing stick indicate all markings on the twig about the joint Similarly, show markings which are characteristic of the twig. The clay model should represent as far as possible the shape, build and character of the specimen.

Exercise 2.—It should now be possible for the children to represent a simple spray, drawing the general plan, the leaf forms, space shapes, and a very fair representation of the leaf joints and texture outline of the main stem.

Provide each child with a small spray of aucuba placed on white paper or fixed in an upright position in a lump of clay From the spray in this position let the children plan the direction lines of the main stem and leaves. Time should be spent on this initial work so that space shapes will work out correctly The next stage is to draw the stem, keeping in mind the lengths suggested in the clay model The joints will be drawn by reference to the handwork on the model, and though the effort may be crude it will be near the truth, and the old fault of drawing joints in one plane will be avoided The method is right and practice will lead to correct drawing. The leaf forms are interesting; they present an almost semicircular base and a fairly uniform width, and they taper off gradually to a distinct point. The slight notches in the leaf edge give character to this leaf, and further details which are observed may be added

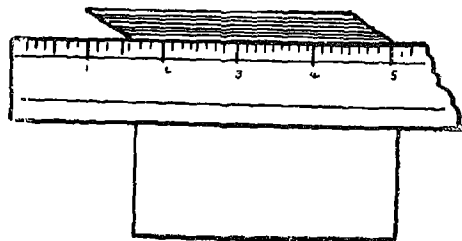
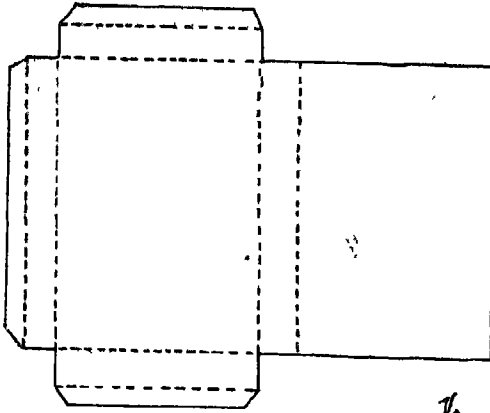
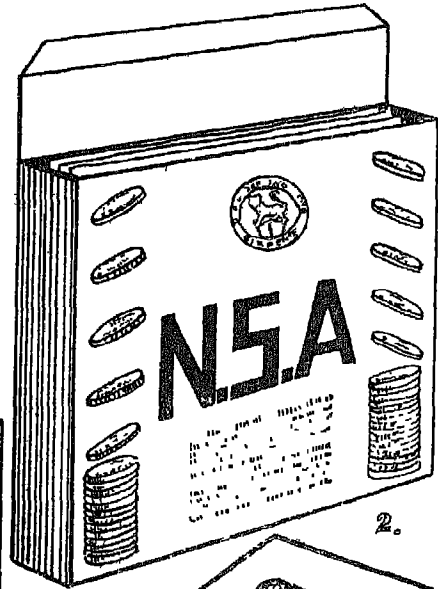
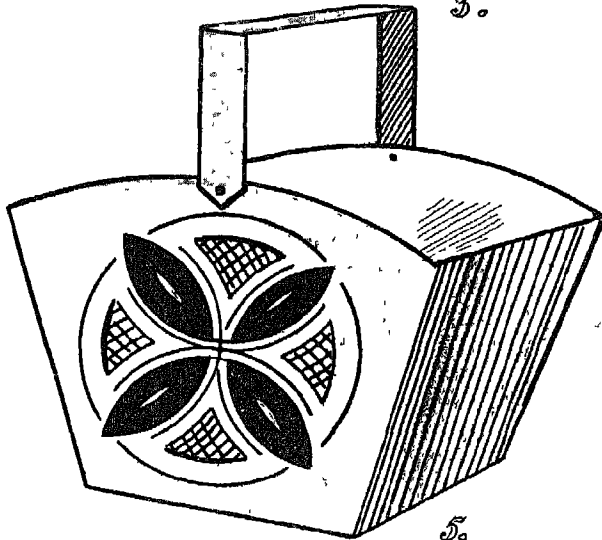
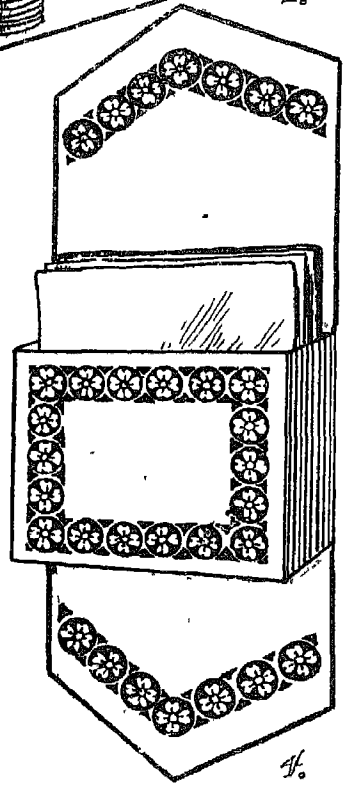
There should be no attempt to shade these natural forms Simple outline is the most effective medium for the purpose, so long as rhythm is expressed

To ensure the careful rendering of details, excellent practice is afforded by drawing enlarged sketches at the side of the main drawing These sketches will illustrate the powers of accurate (or inaccurate) observation

XIII. HANDWORK AND COLOUR

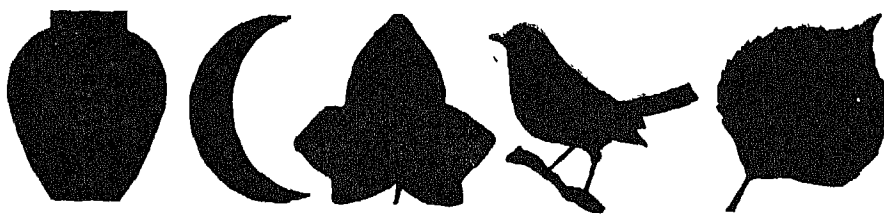
Introduction.—A useful exercise in handwork and colour is provided by the construction of a card case suitable for holding stamp cards for National Savings Certificates, clinic cards or other records which the children need to preserve in a clean and flat condition The case should be made of light cardboard or stiff paper. Coloured papers will be needed for decorating the cases.

Exercise 1.—Draw a rectangle 8 in long and 5 in wide. Mark off on the top and bottom of the longer sides—½ in, 3½ in, another ½ in and 3½ in again Join these points from top to bottom, extending the second and third ½ in at the top and bottom and joining their ends Draw flaps on the lines just completed At the left-hand side draw a flap for fastening Cut the whole shape out cleanly In every case fold by using a straight edge to keep the corners square, Fig I

When the case is neatly completed by folding and gumming, coloured paper should

USING THE STRAIGHT EDGE FOR FOLDING

HANDWORK AND COLOUR

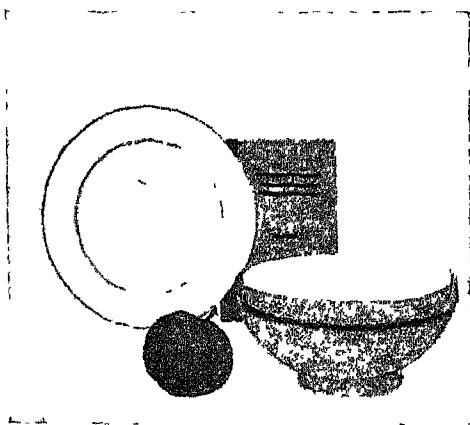
1 Plan for Case 2 Decorated Case 3 Lettered Slogan 4 Wall Pocket
5 Basket

be used to cover the whole of the outside. The coloured paper could have been applied on the back of the planned shape before folding, but gumming and folding are apt to mar the effect. Now the children should prepare cut-outs of coloured paper with which to decorate the case They should also plan a space for simple lettering. The pattern scheme should be composed of two colours additional to that of the box and should be of a simple character The children might try to make the decoration suggestive of the purpose of the case, but the arrangement of colour and pattern should be devised by them, so that each case represents individual effort and invention, Fig 2

With their spare coloured paper and cut-outs they can make a decorated card, invent a suitable slogan and print it on the card in careful lettering Their interest in the subject will thus be aroused with possibly good results Other suggestions for handwork will be found in the Plate

Cut-outs for Decorative Purposes

XIV. COLOUR HARMONY

Preparatory.—Much educational value is attached to the making of paper shapes and the arrangement of them to produce an interesting result in colour harmony. On white paper let the children draw and cut out object shapes on a fairly small scale. Give each child coloured papers (red, orange, green and violet) and a rectangular shaped piece of olive gummed paper.

Exercise.—Let the pupils draw and cut out in white paper a circular plate, an apple, a bowl and a book These shapes should be used as templates for re-cutting in the coloured papers—a blue book, a green plate and apple, and a violet bowl (These objects are given only as examples; different objects may be chosen and used in the same way) On the olive background stick the blue book, and then the green plate partly covering the book. The violet bowl is placed in position, also hiding part of the book, while

Colour Harmony

the apple finds a place near the front. This colour scheme may be made more interesting by suggesting in colour or pencil the cover of the book, the lines of the plate, the curve of the ellipse on the bowl and the stem on the apple No reasons for the selection of these colours need be given here With the remaining coloured paper the children can experiment in further arrangements and so express their sense of colour harmony

XV. BRUSHWORK AND PATTERN MAKING

(Colour Plate No 163 B in the portfolio)

Preparation.—Show the class various objects illustrating shades of green These may be a book, a leaf and a green boat, or whatever else is readily available for the purpose Obtain a few green papers and pin them against white paper on the blackboard in view of the class, numbering them one, two, three, etc The objects should now be shown, and the children asked to decide which paper corresponds in colour to the object in view Discover by questioning why certain papers are rejected, and what constitutes the difference between the colour of the object and the paper In this way the teacher will find out whether the children see a preponderance of blue or of yellow in the colour This discrimination will prove valuable in the selection of greens later on.

Exercise 1.—Remind the children of the experiment made by them in the last brushwork lesson with the primary colours, and they will remember that when they mixed chrome yellow with Prussian blue or cobalt they produced a green. Having supplied them with these colours and black and white, tell the children to mix the blue and the yellow on their palettes until they have made a good green. It would be well to direct their attention to the coloured paper which most nearly matches the leaf shown, and ask them to endeavour to match its colour. When this has been done, they may prepare a colour scale as in previous lessons with the aid of the black and white This needs no explanation, and the left-hand side of their book should show the scale ready for reference

Exercise 2.—Each child should now be provided with a simple leaf. In order to secure the greatest uniformity of colour possible, the leaves should all be taken from the same tree. The leaf of the lilac is a good green for this purpose, the evergreens being too subtle in colour to match at this stage Let the children move their leaf up and down the scale until they have discovered the tint or tone which matches it Now place the leaf on the paper and make a pencilled outline Try to remember how the particular colour in the scale was produced, and mix the green with the requisite amount of black or white to secure this colour value. When all has been prepared, paint the leaf. The children should not be troubled with the veins, but when the surface of the leaf has dried they can paint in a white line to suggest the midrib This should be lightly drawn so that the green colour shows through the white, Fig 1

Exercise 3.—A further interesting exercise may be added to this lesson, and will be useful for practice in putting down simple washes on a small surface, thus preparing the children for the elements of pictorial illustration, Fig 4 In a rectangle (4 in by 3 in) let the children place a pale blue

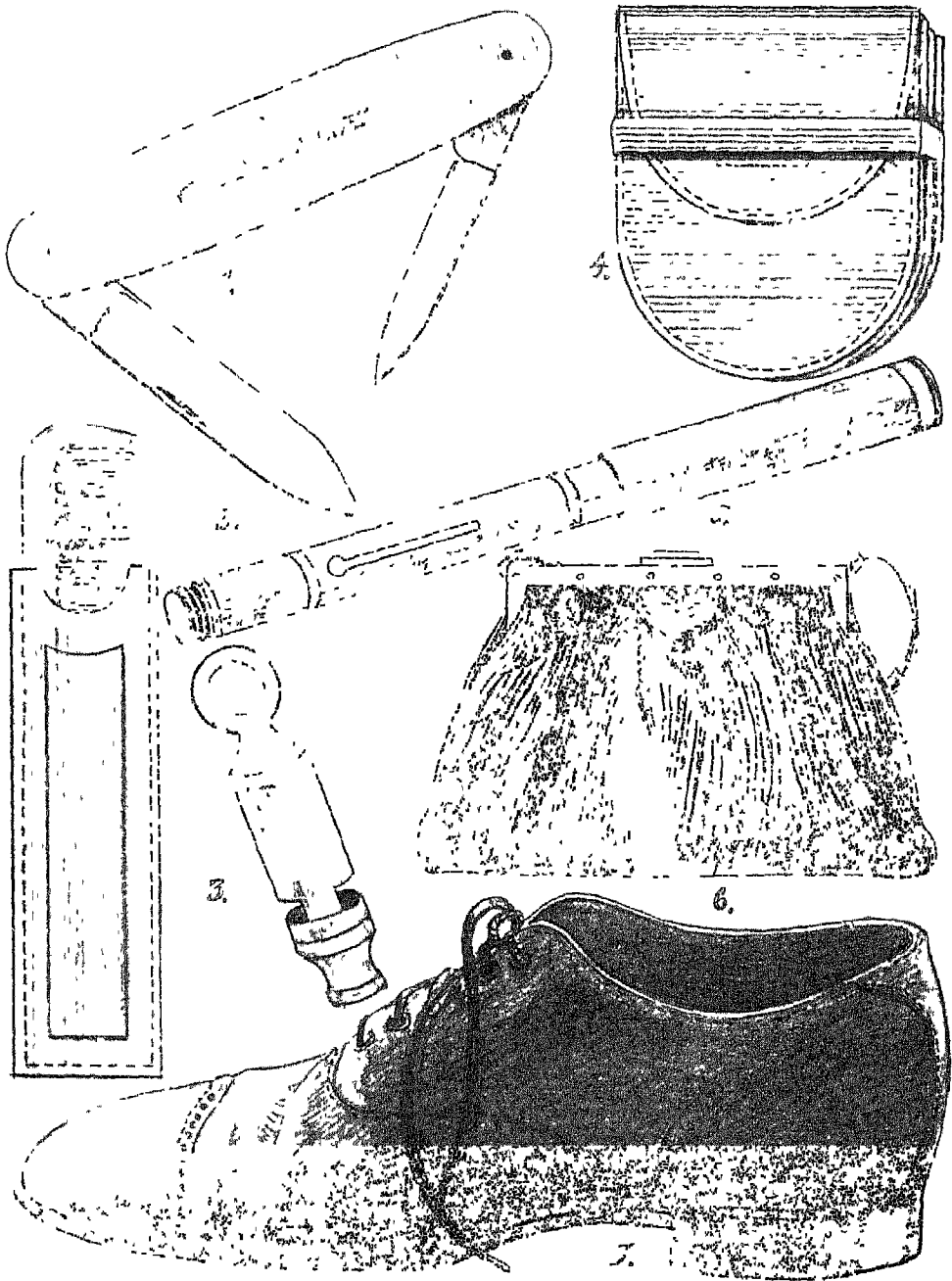
wash. This should occupy most of the upper part of the rectangle. In the lower part pale green can be washed in and irregularly brought up to the blue to indicate land slopes. Trees can be suggested by dark patches of green meeting the land slope This effort must not pretend to be picture composition, but it is an interesting addition to the teaching given in the previous exercises

XVI. COMMON OBJECTS—PENCIL

Introduction.—In dealing with children a surprising interest may be aroused and stimulus given by occasionally asking them to produce something of their own to draw This introduces a variety of shapes for drawing, and each child has its own special set of observations to express In other words the children are not, as is usually the case, drawing different views of the same object A peculiar value attaches to occasional work of this kind, and surprisingly good, free pencil work often results

Exercise 1.—Ask the children to find something from their school bags, cases or pockets, and place it in a favourable position for being truthfully represented The objects will be mostly small and can be drawn to full size. Such objects are generally purses, hand bags, fountain pens, penknives, comb cases, whistles, ink bottles, scissors, pistols, tops, etc, Figs. 1–6 The children will indicate first by leading lines the general shape and proportion of the object selected When the main lines of the shape have been planned, the children can attempt the details. These may involve shapes not yet attempted, but the children's perception is keenly alive; they will make special efforts to do well, and the information gained will be of great value Carefully examine the drawings, they will doubtless suggest limitations, but they will also reveal a keenness of observation that the routine drawing lesson does not always produce

Exercise 2—Our next exercise is the drawing in pencil of a shoe, Fig. 7, an irregular shape which demands careful observation Place a shoe in a position which gives a side view to the class Its general appearance is easy to plan, but its lines offer scope for careful rendering It will be helpful if the use of the shoe is recalled and also its particular need of fitting the foot Having planned the proportions of the shoe, the children can attempt its outline This is a series of interesting curves which take their form from the shoe being laced to the foot. The heel curve takes first the shape of the leg, then curves to form the heel and lastly flows inwards to join the heel The curve over the instep begins on the opposite side, flows outwards and back to the junction of the toes, the foot curve flows brokenly over the foot owing to bends, and upwards, over and in to the point of the shoe The curve of the sole and heel begins at the toe and is formed of three curves—a long one for the sole, a short inward curve for the arch of the foot and another for the top of the heel This ends at a point level with the toe The heel and sole can be added following these curves No part of the shoe is really flat, but the level of the heel and sole bottom must be exactly the same

These facts the teacher will have in mind while the children draw, and he will warn them about rigid lines A boot or shoe offers an excellent exercise for expressive line work, especially if it is one actually in use Minor details such as lacing and a partial view of the opening may be indicated, as it is not an exercise in silhouette but in realistic drawing.

COMMON OBJECTS—PENCIL

1 Penknife 2 Comb in Case 3 Whistle 4 Purse 5 Fountain Pen 6 Bag 7 Shoe

XVII. DRAWING FROM MEMORY—PENCIL OR BRUSH

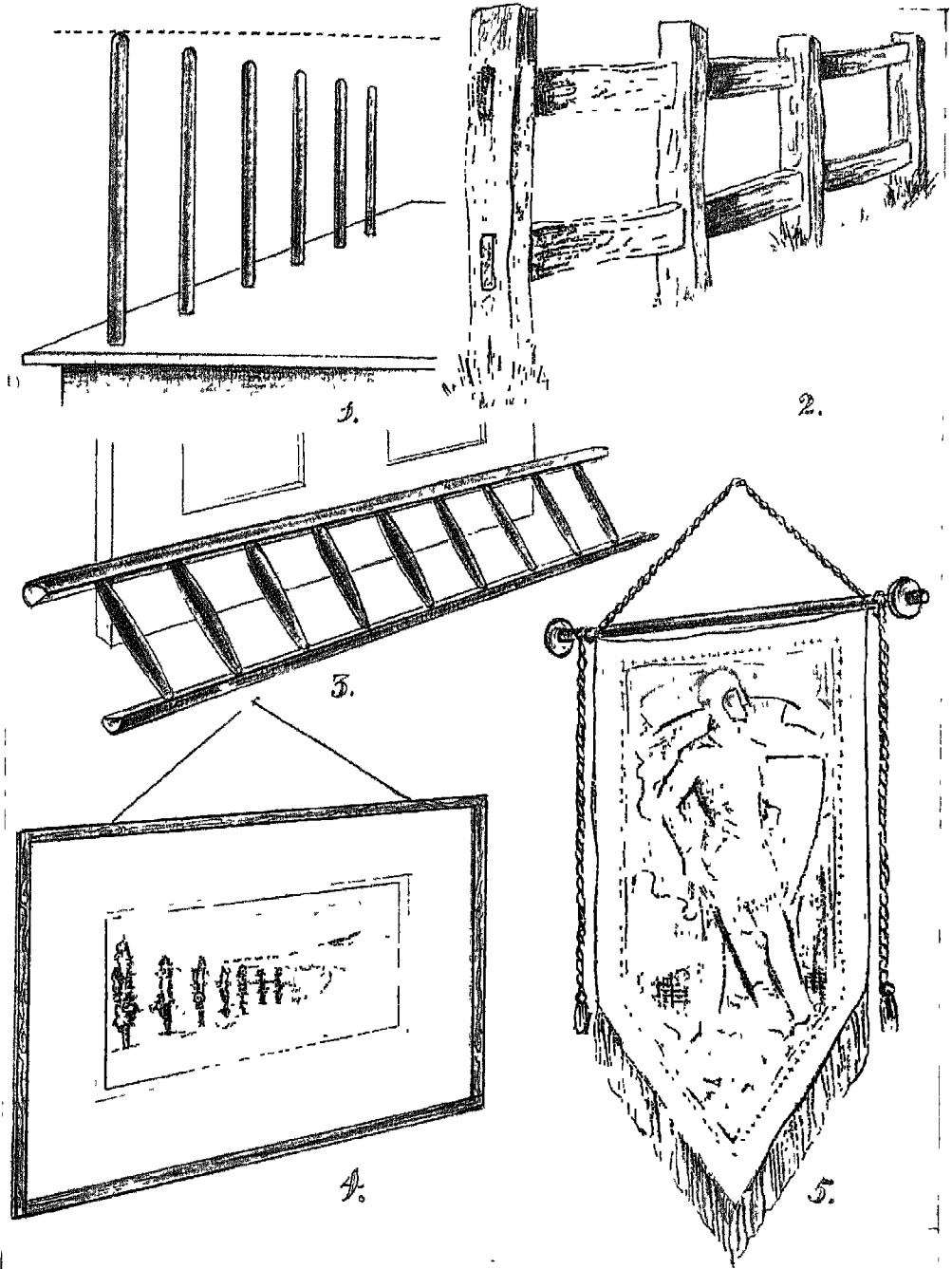
Exercise 1.—Show a hand bell to the class for three minutes Assist the children's observation by recalling the conelike shapes of a previous lesson, trace the line from the base of the bell to the top of the handle The remaining points should be left to the children's observation—the proportion of the handle length to the bell, etc The bell should then be removed, and the drawing should be made in from ten to twelve minutes; it should be to a fairly good scale, but not really large Note especially whether the children have benefited by the teaching in former lessons, whether they plan the shape or begin with aimless effort The results will indicate whether the cone shape has been perceived and used; whether ellipse shapes are properly rendered and the general proportions have been accurately visualised.

Exercise 2.—Remind the children of the action figures made in a previous lesson, and recall the various postures illustrated by their use If time permits, let them redraw some of the figures in characteristic attitudes The memory work in this exercise is of the nature of the "snapshot" drawing described at the beginning of the course. Place the following list of subjects on the blackboard and let the children select one of them for drawing Many teachers will prefer to let their pupils attempt the compositions in brushwork rather than in pencil

(1) A boy flying a kite
(2) A girl catching a ball.
(3) A man digging.
(4) Jack and Jill carrying the pail

XVIII. PASTEL DRAWING—RECTANGULAR SHAPES

Introduction.—Show the coloured rectangular block used in the last pastel lesson to illustrate colour shapes This was variously coloured in order to define clearly the length, breadth and thickness A few questions put to the children will recall the use to which this block was put

Exercise 1.—A box wrapped in blue paper will make a suitable object to illustrate the three planes Place the parcel in a good light and ask the children carefully to examine the colour shapes with half-closed eyes How many shapes do they see? Are they of the same colour? Which is the lightest or darkest? In this way their powers of colour selection will be exercised Ask them to draw in charcoal the shape of which they see the most. Now add the shape which is next to it, and finally the shape which they see at the top If this produces fairly good results in shape reading, ask the children to cover the whole drawing with a first grade of blue, corresponding to the middle blue on the object A little violet or black will be used with more blue on the darker side, and a little white mixed with blue to represent the narrow shape at the top The main

Pastel Drawing—Rectangular Shapes

1 Coloured Sticks 2 Fence 3 Ladder. 4 Hanging Picture 5 Banner

colour scheme and shape of the parcel will thus be represented; and the folds, string, etc., can be added to give further realism.

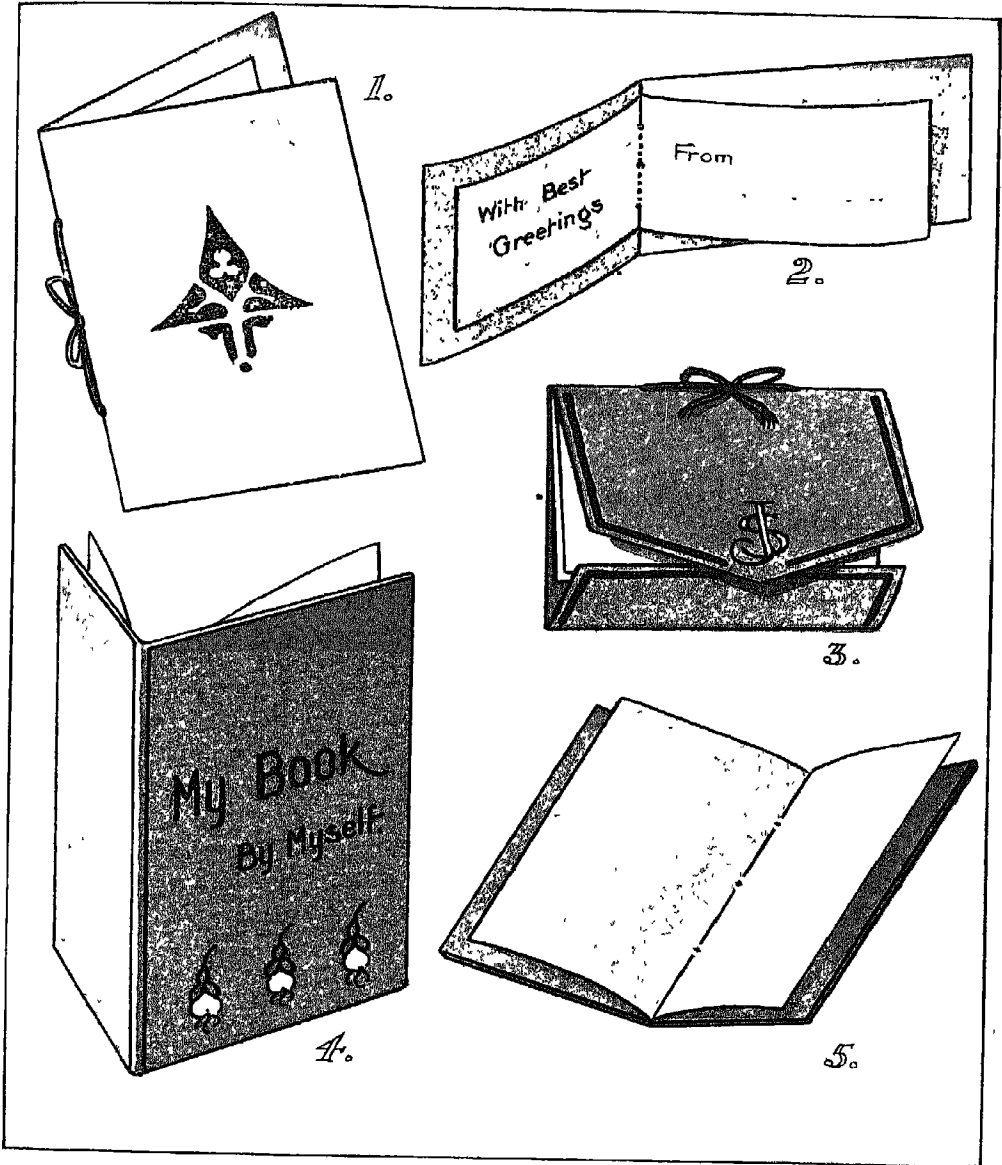
Exercise 2.—A useful exercise is supplied by four or five coloured sticks erected in a row on a table before the class, Fig 1. These can be made by dividing a curtain rod into short lengths, covering the lengths with coloured gummed paper, and fixing each rod upright with a lump of clay at the base. A few lengths of the sweet known as "rock," which is sold in some localities, will do equally well. The rods are first placed in a row at equal distances apart along a table, so that the children see them as being all of the same length The children may draw the sticks in this position, judging the distances apart by comparison with their height. The second part of the exercise (much more important) is to place the sticks across the table at right angles to the class The children are now required to draw them in this position Ask the children what this view reminds them of—tram standards, lamp posts, telegraph poles, a line of trees, a fence, etc, Figs 2 and 3. The children should not be instructed how to represent the sticks but they should be left to observe and draw freely After the drawings are complete, it is a good plan to hold a string horizontally against the top of the nearest stick along the front of the table and ask the children to observe the sticks now, and compare their appearance with their drawings.

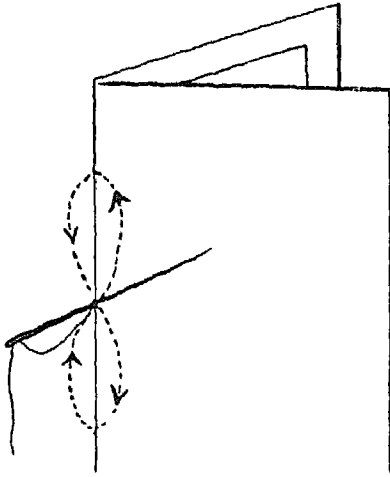
Exercise 3.—The representation of a banner, picture or chart hanging on the wall will be a good exercise if the object is placed in a position giving a side view to the pupils. Encourage the children to see the whole as a shape and draw it as such. When placing the upright lines they should recall the last exercise with the upright sticks, in this way the children are being led to understand an important principle in drawing, Figs 4 and 5

XIX. HANDWORK--BOOKLETS

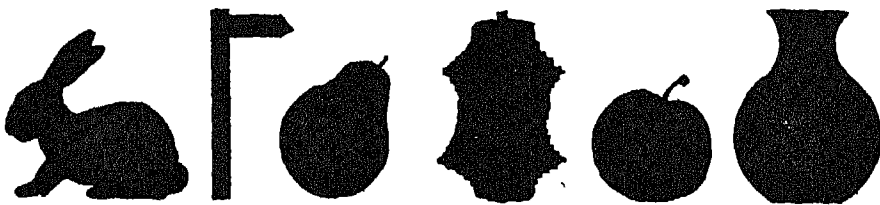
Introduction.—To the practice of making and folding paper shapes it is now possible to add the first elements of making simple booklets. This can be best introduced by constructing covers to contain a single inset. Supply the children with tinted papers from which they may cut rectangles, 7 in. by 4 in From a sheet of ordinary drawing paper a shape 6 in by 3 in. should now be cut to provide the inset. For the purposes of accuracy and neatness this first exercise should be performed by actual measurement Simple folding and adjustment of the inset will lead to poor placing and an untidy appearance Light lines should be drawn forming a ½ in border on the inside of the cover On both the inset and the cover a central upright line should be indicated The inset should now be carefully placed exactly to fit the border

PLANNING THE POSITION OF THE INSET

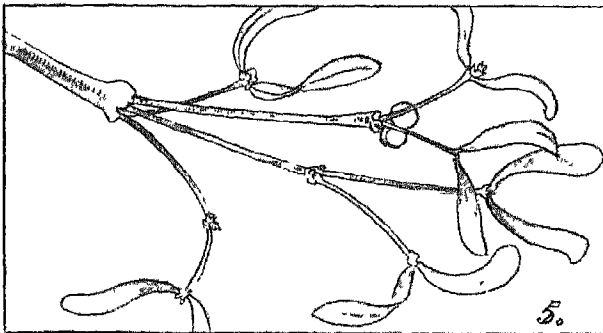
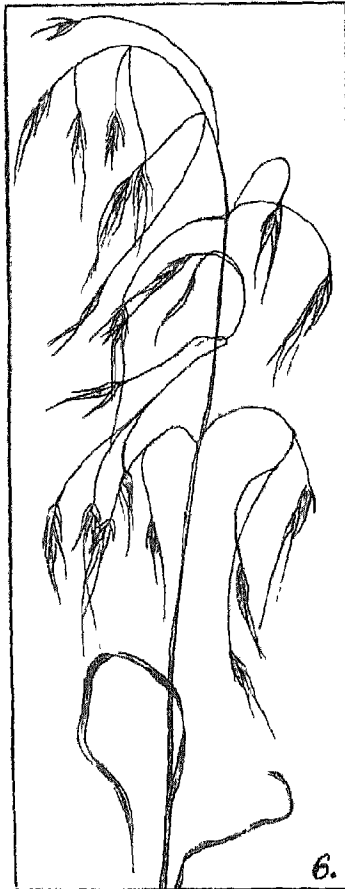
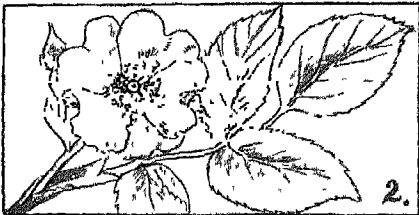
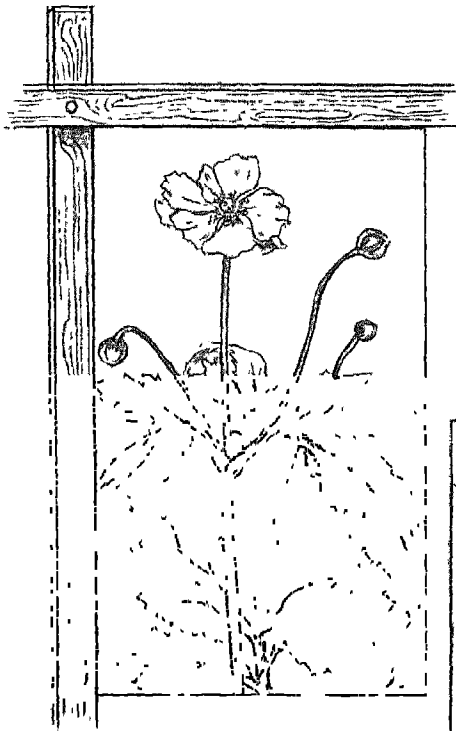
Plate XXIX

Handwork—Booklets

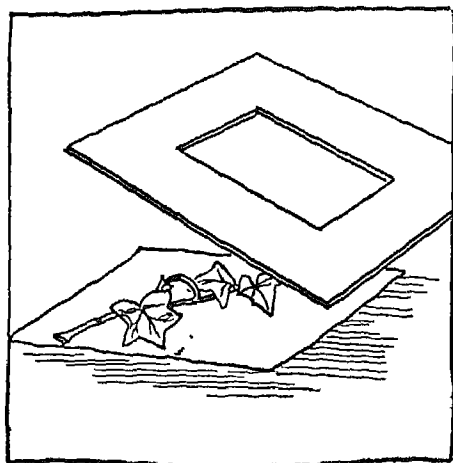
1 Folder with Inset 2 Greeting Card 3 Decorated Folder. 4 Single Section Booklet. 5 Open View of Booklet

THREADING THE TYING MATERIAL

lines and the centre Take the inset away and fold and crease it along the middle line. Fold and crease the cover in the same way. When placed in position again, the cover and inset are ready for sewing with strong thread or with baby ribbon Mark the centre of the upright line, and also place marks 1 in above and below the centre; pierce holes at these three points. Thread the ribbon or thread on a needle and begin to sew from the outside, putting the needle into the central hole, while making sure that both the inset and cover are correctly placed. Draw the thread or ribbon through the middle hole, leaving an end for tying purposes Now push the needle through the upper hole from the inside, and back again through the middle hole, and finally through the lower hole from the inside This will bring the end of the thread or ribbon outside ready for tying Care must be taken that the thread is not drawn too tightly, or the papers will buckle, nor must it be loose, or the inset will always be out of position Cut the thread or ribbon and tie it neatly with a bow knot. The model should now be decorated to suit the purpose for which it is intended Greeting cards of differing shapes, programmes for various purposes, and photograph folders will provide excellent practice in handwork.

To this exercise can be added the making of single section notebooks, sketch books, needlework or other books intended to hold rough designs The paper covers can be strengthened by cardboard or covered with Duxeen or other suitable material Pattern decoration can be added by stick printing or brushwork

CUT-OUTS FOR DECORATIVE PURPOSES

XX. DRAWING FROM NATURE—PENCIL

Preparation.—Provide each child with a spray of foliage, a few grass stems, or a twig, the drawing of which is to be placed within a rectangle. To help the children in planning their drawings in rectangles let each child have two strips of paper which he can adjust at right angles about the specimen in various positions, until he arrives at a

DRAWING FROM NATURE—PENCIL

1 Buttercup 2 Wild Rose 3. Indian Pink. 4 Rose 5 Mistletoe 6 Grass

USING A "FINDER" TO PLAN A NATURE DRAWING

plan which is pleasing to the eye As a further aid for this purpose of planning the required shape, let each child cut out a rectangular opening in a piece of paper, which may be adjusted between the eye and the object to secure the best position for the border lines

Exercise 1.—Place the spray on white paper and ask the children to look at it through the rectangular opening of the "finder," which is held between the eye and the object so that the spray is seen as if in a picture. The "finder" must be raised or lowered so that the object fairly fills the space and its main lines compose a pleasing arrangement. It may be necessary to turn the "finder" lengthways to make a better picture of the spray. When a good picture has been found, the children should notice especially how the leading lines take position. Now with their strips of paper they can experiment around the spray and decide where the border shall be placed to secure the shape they have seen. They will now draw a rectangular shape on their books and in this shape place the leading lines of the spray From this stage they can proceed with their drawing.

By using the strips around a variety of sprays, the children will learn to appreciate the pleasing proportions of rectangular shapes and the pattern which every tree and plant presents if we know how to look for it.

Exercise 2.—In continuance of the first exercise let the children spend a little time with the paper slips and "finders" in making rectangular shapes to suit nature drawings already done in their books The children can turn to one of their previous exercises and experiment with their "finders" until they are satisfied with the shape Encourage them to try one shape after another, keeping in mind that they are seeking to make a pattern and a pleasing picture of their drawing When the children have found the best position for the border lines they should draw them. The pupils will be surprised at the different appearance this gives to their drawing, and incidentally they will be acquiring a knowledge of the first elements of picture composition.

XXI. HANDWORK AND COLOUR

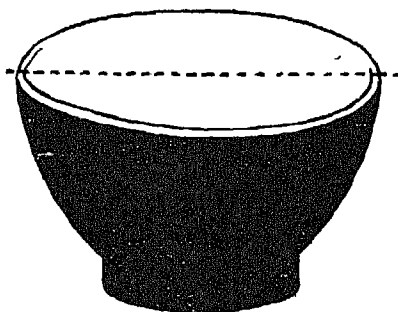
(Colour Plate No. 166 B in the portfolio)

Preparation.—Coloured gummed paper and scissors will be required for this lesson, in which is continued the revision of shape making with harmony of colour and pattern making. Each child should have a set of good colours from which to choose, and should be asked to select a colour (6 in. square) which will be suitable for a bowl.

Exercise 1.—Cut a semicircle from this paper, and from the waste cut a shape to form the base of the bowl To show the inside of the bowl, cut out an ellipse shape of the same width as the top of the bowl If the bowl has a primary colour, think which secondary colour will go well with it and cut the ellipse from this Stick the ellipse across the diameter of the semicircle. To ornament the bowl use a simple band of colour cut from the paper, following in its length the lines of the ellipse, and at its ends the lines of the bowl.

Exercise 2.—The remainder of the lesson can be carried out entirely by the children. They are to ornament the bowl with various cut-outs of their own choice, which may be flowers, animals, toys or simply shapes The colours are to be chosen and arranged by them, and on some plan which they have thought out for themselves. (See Fig 3, on the Colour Plate.)

Exercise 3.—The children are required to decorate a basket made in silhouette from coloured paper A rectangle of the paper, 5 in long and 3 in. wide, is folded across its width, and an oblique cut is made from the top corner of the open end to a point 1 in from the bottom corner of the same side. When opened out, the paper gives the basket shape, to which the handle can be added from the waste. The children can then select colours which please them and make differently coloured cut-outs of fruit shapes to place in the basket The further decoration of the basket and handle can be done by the use of cut-outs already prepared (See Fig 4, on the Colour Plate.)

In this way the children's sense of colour selection and colour harmony is given free exercise, and it will lead them without technical difficulties to the expression of their colour perceptions in an attractive form. Further simple cut-out shapes may be made of the vase and the child's frock, Figs 5 and 6, on the Colour Plate

SHAPE MAKING IN PAPER

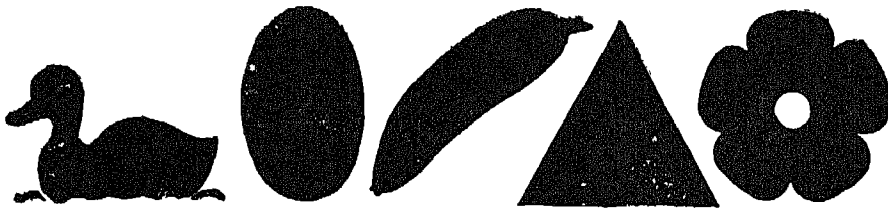
XXII. BRUSHWORK AND PATTERN MAKING

(Colour Plate No 164 A in the portfolio)

Introduction.—Children love to "make something," and the decoration of their models gives an additional charm to their work, while the effort required to make a model attractive leads to the perception of beauty

Preparatory handwork.—Provide each child with a sheet of strong drawing paper, a choice of gummed coloured papers, scissors, and materials for measurement Instruct the children to draw a rectangle, 8 in long and 2 in wide, at the bottom of their drawing sheets, and to divide this rectangle into four equal squares by upright lines 2 in apart Now let them divide the rectangle in half lengthways, by marking the middle points of each end (1 in from top and bottom) and by joining these points. Now mark $\frac{1}{2}$ in. on each side of every upright

line along the base of the rectangle, and also along the middle crossway line Join the corresponding points on these two lines by a series of upright lines On the top side of one of the four squares draw another square of the same size On three sides of this top square draw flaps and place another flap at one end of the rectangle We have now the development of a square stool The lines needed for the outline of the stool can be ruled boldly to make the shape clearer (See Fig 1 on the Colour Plate)

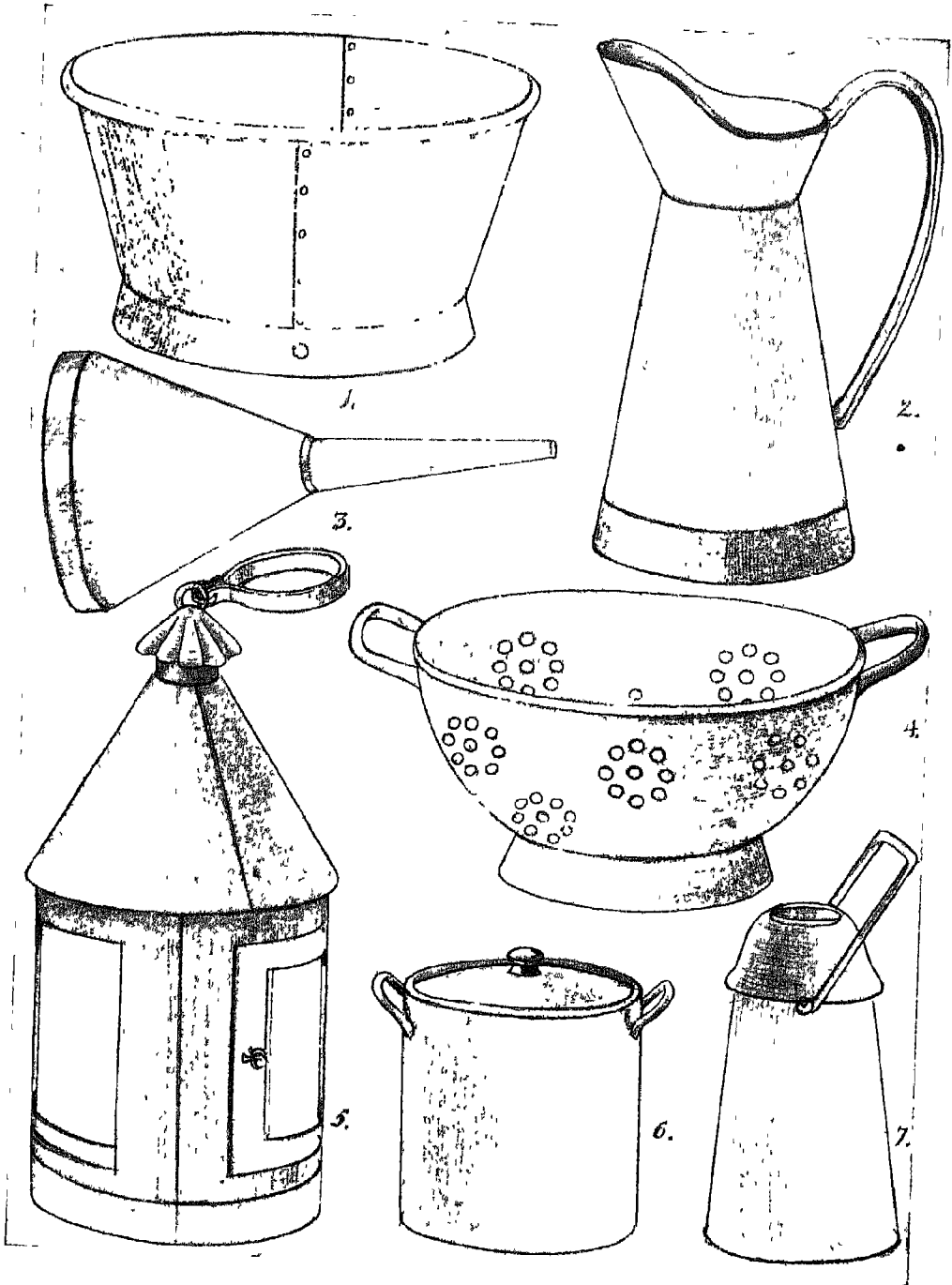
Exercise.—The children can now prepare a wash of their own choice, and colour the drawing which they will afterwards cut out. While this is drying, they can prepare coloured cut-outs—also of their own choice—with which to decorate the stool The children should not be restrained in their selection of the colour and shape of their cut-outs Allow their creative faculty full play, but direct the method of preparation of cut-outs—as in previous lessons—and encourage the idea of producing a pattern which may render their stool an object of beauty, Fig 2 It will be noticed that an absence of instruction is evident in this exercise. This is purposeful The object of the lesson is to give the children scope for their own invention, but their practice is founded upon definite instruction in former lessons. Further exercises may be given in the decoration of paper models of baskets, Figs 3 and 4, on the Colour Plate

CUT-OUTS FOR DECORATIVE PURPOSES

XXIII. OBJECT DRAWING—PENCIL

Introduction.—Having drawn ellipses, conical and cylindrical shapes, the children will now find it interesting to represent objects which combine these shapes in various forms. Such objects should be shown in simple positions so that the shapes may be readily perceived.

Exercise 1.—A foot bath makes a good object, and offers no real difficulty in drawing The inverted cone shape can be recognised and used in planning the sloping lines which form the outline of the shape of the bath Having looked well at the object as a shape in colour, its proportions can be readily shown The ellipse forming the top—which is a white shape—can be added to the outline. The line showing the join between the body and the base is also part of an ellipse This is met by a part-cone shape which slopes in the opposite direction, and forms a collar, exactly fitting the base curve These are our main lines for drawing the bath The joints, rivets, rim and handles can be attempted by those who feel able to do so, Fig 1.

Exercise 2.—An enamelled jug may be drawn on similar lines The proportion is

PLATE XXXI

OBJECT DRAWING—PENCIL

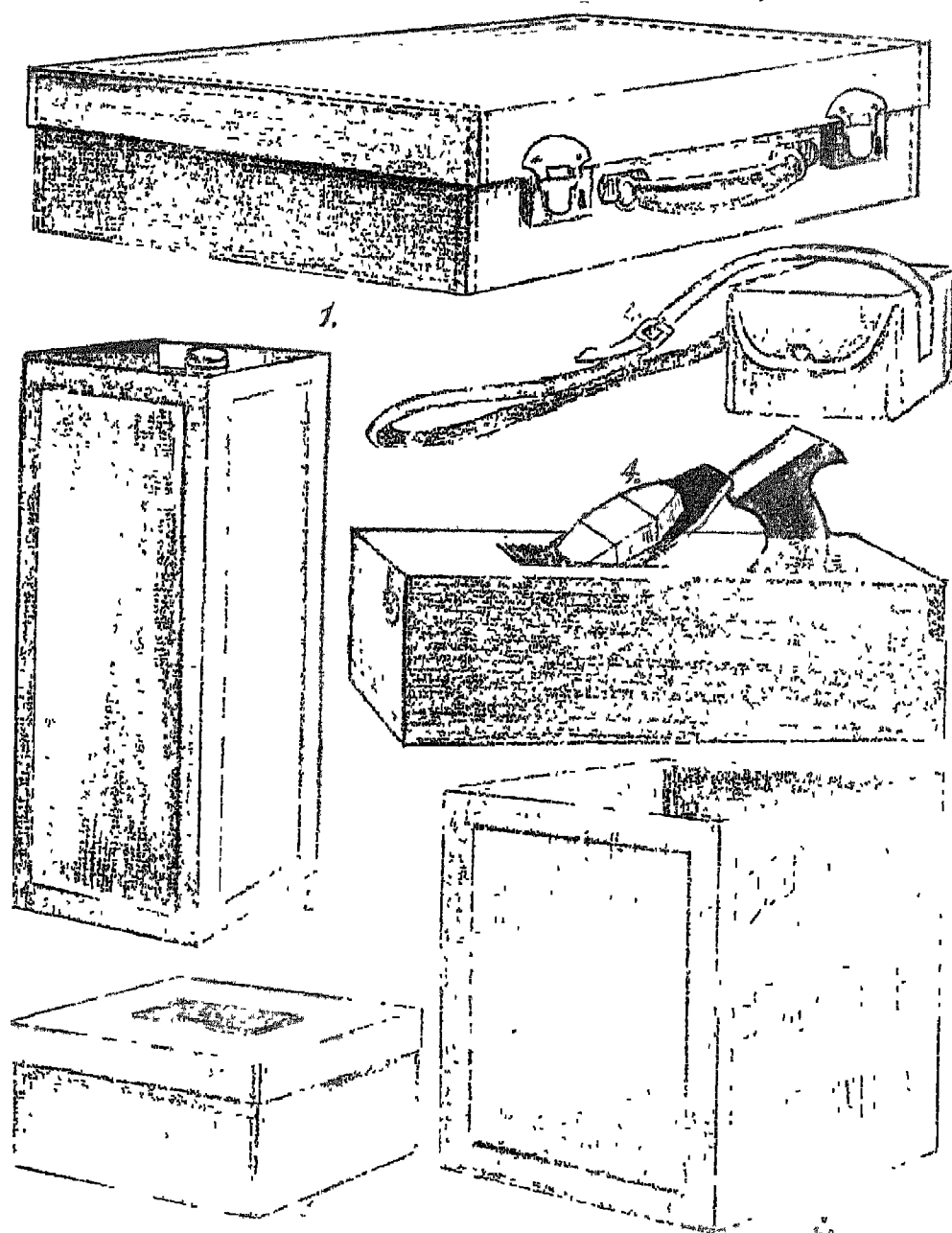
1 Foot Bath 2 Water Jug 3 Funnel 4 Colander 5 Storm Lantern 6 Can 7 Tea Can

different, but again we have one cone met by another. The sloping lines of the main shape will give a general plan to which we can add the top and bottom ellipses The top forms a conical shape with bordering lines of different lengths which are joined by an interesting curve. The base will provide a test of observation and the children should be left to indicate what they see. If provided with a rim, the base is cylindrical, and it will be interesting to see if the children present it as such The handle can be placed in position as it is a simple shape, Fig 2

The following objects may be used for further exercises storm lantern, colander, funnel, oil cans (small and large) and a tea can It is unnecessary to repeat the methods which are applicable to these and various objects of similar construction Certain points of interest belong to each For example, the colander, with its lines of perforation, supplies a useful series of ellipses applied to the semicircular shape. The storm lantern exhibits the same features applied to the cylinder, together with verticals to indicate the limits of the glass or horn. Most of these objects offer difficulties of detail, but these should not be anticipated, as they will appear again later in the course and will be dealt with then

XXIV. PASTEL DRAWING—RECTANGULAR SHAPES

Introduction.—In a previous lesson (No XVIII), shapes were considered as they were seen on a simple rectangular solid, representing the new planes suggesting width It is necessary to use a background in every exercise, so that the shapes are clearly defined and more easily perceived Those teachers who have been accustomed to draw common objects in perspective may consider that the objects selected for representation in this lesson are too difficult It has been proved, however, by experience, that if the children are trained from an early stage to depict shapes as they see them, they will be able to make perfectly satisfactory drawings of apparently difficult objects No knowledge of the principles of perspective is needed Impress upon the children always to draw what they see, and then, if a suitable background and a foreground are provided and the object is placed in a good light, the children will be able to place the shapes of the ellipses, rectangles, etc , in correct relative positions

Exercise 1.—As an exercise in colour work an attaché case will be a useful object, Fig 1 Ask the children to select the pastel which most nearly matches the colour of the case At this stage exact colouration may not be possible, but additions can be made later to produce more faithful representation The three shapes will be first discussed and afterwards drawn in charcoal The children will now be able to place them in their proper relation to one another The colour chosen can then be applied in the first grade, evenly and clearly. With half-closed eyes the children will note the effect of light upon the object. The addition of a little white or perhaps orange will represent the top of the case, while the side removed from the light will need the addition of a darker brown. The line made by the lid can be indicated by the use of dark brown Now use the original colour to give a second grade appearance to the whole, and finish the work off smoothly. Handles and fastenings may be omitted except by children who feel able to represent them

PASTEL DRAWING—RECTANGULAR SHAPES

1 Case 2 Camera Case 3 Petrol Can 4 Plane 5 Coloured Box 6 Biscuit Tin

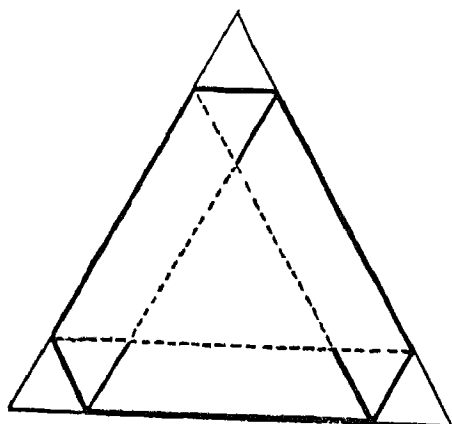
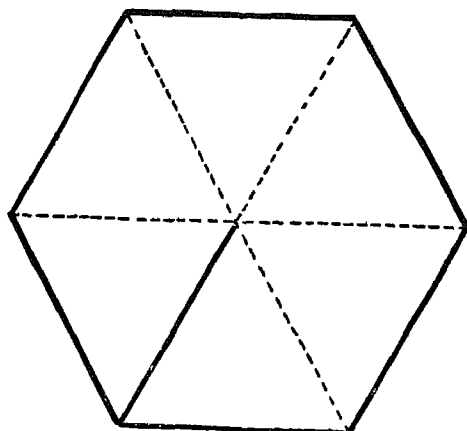
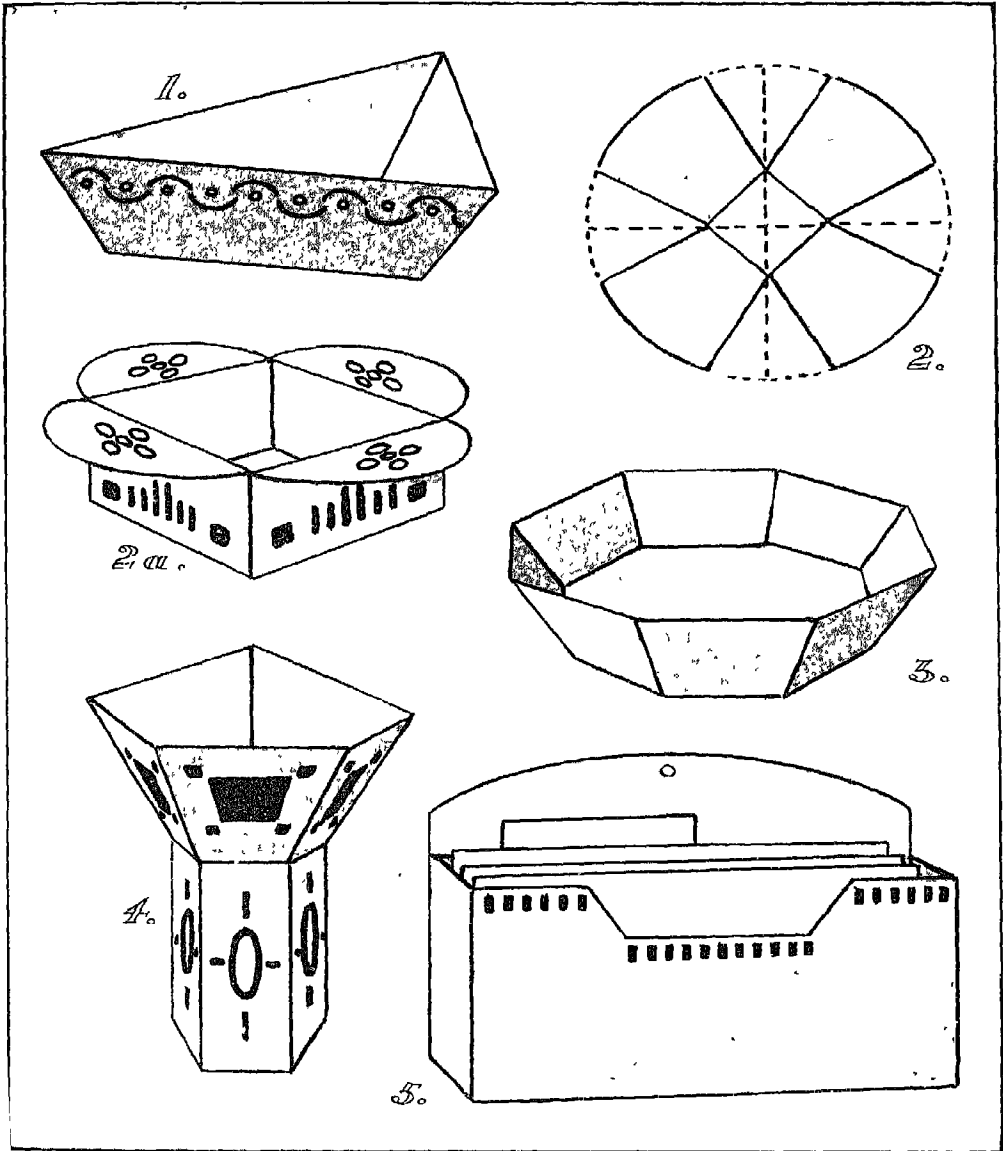
Exercise 2.—A carpenter's plane will make an additional exercise, and the children can use the same methods as in the last exercise Place the object in such a position that an end view is impossible to any member of the class. The shapes of this object need careful observation, but if read correctly they will be of real assistance in suggesting the proportions, Fig. 4. The slot and handle provide definite shapes and can be drawn

Further objects for practice are biscuit or chocolate boxes, books with coloured leaf edges, petrol cans and cartons.

XXV. HANDWORK—TRAYS

Exercise 1.—Provide a paper model of a triangular tray for the purpose of investigation by the class The children will see that the tray has three sloping sides and a triangle of equal sides for its base Unfasten the corners and spread the paper flat. It is found to be a triangle having equal sides with the corners cut off. Let the children make a similar triangle with sides of 5 in From each corner mark an inch along each of the sides and join the points by dotted lines, parallel to the sides. The meeting of these lines will form the corners of the base. Join the inch points across the corners and snip off the little triangles Cut into the right-hand sloping side at the inch mark as far as the line of the base. Cut similarly into the bottom line at both inch marks. Turn the model over and fold upwards along the dotted lines. Use a straight edge and tuck the flaps inside. These will be neatly gummed and the tray can be washed with a tint of colour and decorated for use as a pin tray, Fig 1, Plate XXXIII.

On similar lines various interesting tray shapes can be devised The circle shape will provide many good examples. The square tray with overhanging sides is suggested by the circle, Fig. 2; while the hexagon and octagon are further varieties, Fig 3.

Exercise 2.—Show the class the model of a basket having five sides. By investigation this is seen to be constructed from a circle divided into six equal parts Where compasses are not available, a strip of paper

Plan of a Triangular Tray

Plan of a Basket with Five Sides

HANDWORK—TRAYS

1 Triangular Tray 2 Layout 2a Decorated Surround 3. Octagonal Tray
4 Basket on Stand 5 Card Case

will serve the purpose of a radius. Measure the length of this radius six times as chords round the ring of the circle. Mark the points found and join them across the circle Trim the circle along the lines made and cut into it along one of the lines leading to the centre. First fold the shape neatly across each of its diameters, folding the loose triangle inside and fastening it. A strip of paper will provide a handle A base for this basket can be made from a rectangle of paper divided into six parts, folded along the lines of division, and having the sixth division folded over the first This five-sided model will make a suitable stand for the basket which can be used for storing buttons, odd cottons, etc., Fig 4

XXVI. HANDWORK AND COLOUR

Units Suitable for a Potato Stamp

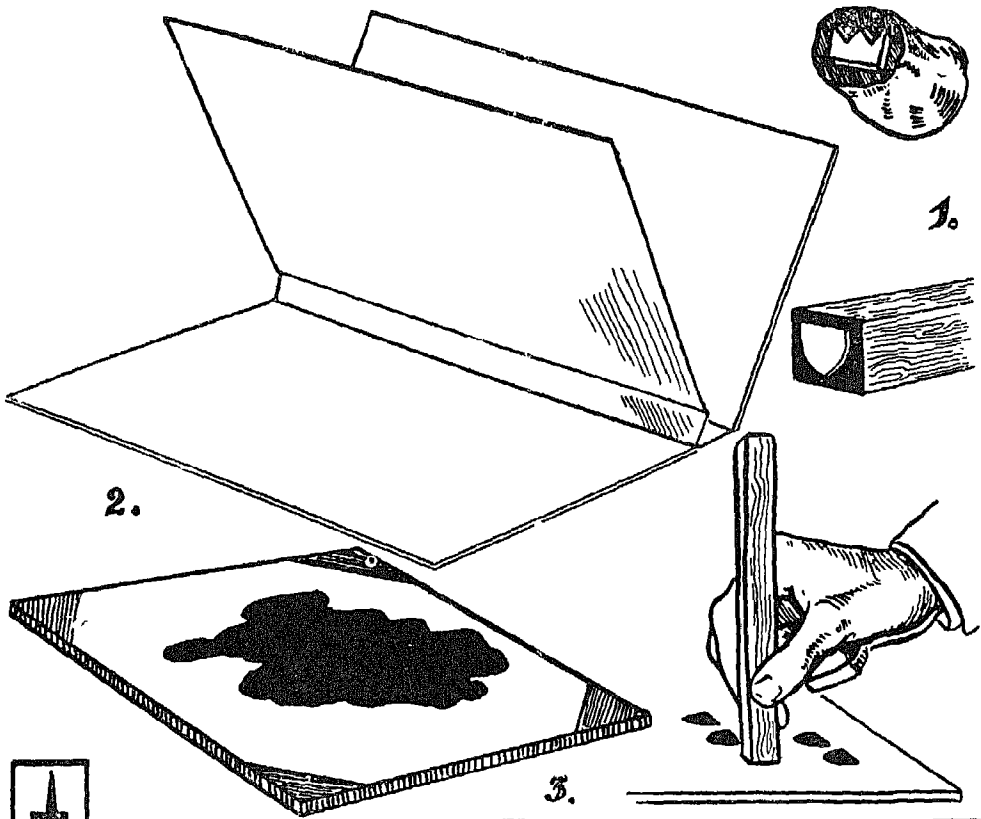
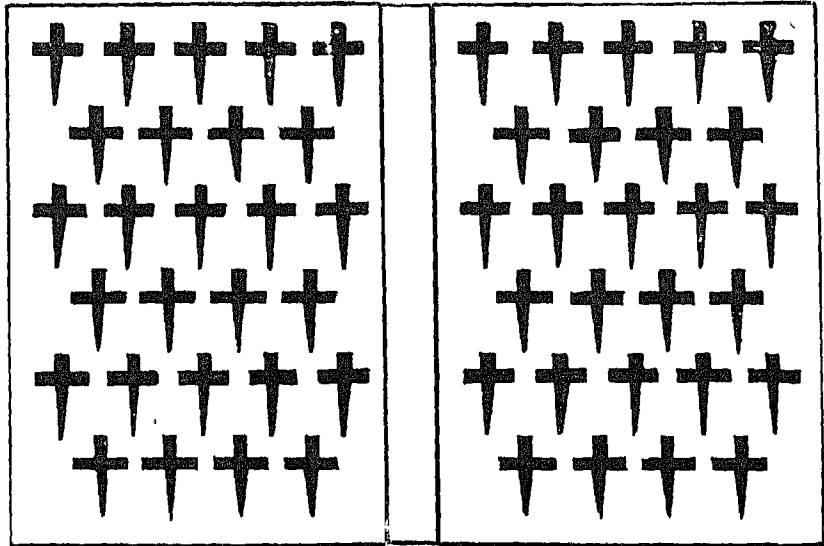
Introduction.—The children have already learnt to make simple notebooks with decorated covers Further decoration for such books can be given by means of end papers. These decorated papers can be added to books already made, or may be prepared for the completion of new books The usual tools, etc , for cutting out will be required, and preparation must be made for devising pattern stamps either with sticks or with potato cuts, Figs 1, 2 and 3

Exercise 1.—Let each child be supplied with a sheet of tinted paper sufficiently large to fit the covers of the book, allowing for the width of the backing As no material is used for covering, the end papers will exactly fit the inside of the covers If tinted paper is not used, the children can use a pale wash on white paper The paper must be carefully measured, ruled and cut out.

Exercise 2.—The next stage is to prepare stamps with which to make an all-over pattern. Potato cuts are easily provided and quickly made. For this purpose the shape made should be small and of a simple character. The unit chosen for the pattern should be in keeping with the purpose of the book; e.g if it is a nature notebook the unit might be a simple leaf or flower; for geography the unit might be the shape of a continent or a mountain, for history, a shield, sword or crown would make a suitable unit

The shapes should be chosen by the children They can be cut from a potato which makes a good stamp with which to repeat the pattern The colour should be placed with a fairly dry brush on a felt pad or on blotting paper, the moist, starchy potato will do the rest. After a few trials good copies will be stamped, and the children can arrange their patterns on both rectangles of the end paper, Fig. 4 Each rectangle should show the same arrangement of pattern.

Exercise 3.—The decorated end paper should be allowed to dry and then be care-

PLATE XXXIV

HANDWORK AND COLOUR

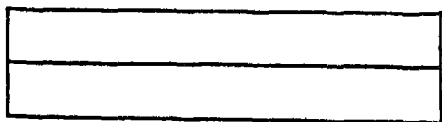
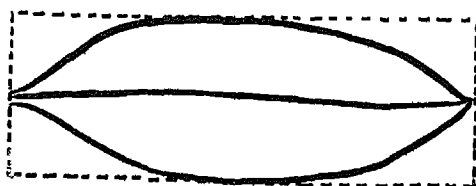
1 Pattern Stamps 2 End Papers 3 Stamp Printing 4 Lettered Back and Pattern for an End Paper

fully pasted into the cover of the book. The pressing should be done from the middle of the book, working outwards to the edges of the cover in order to avoid air bubbles and creasing Place a piece of clean paper over the pattern before pressing The paper between the rectangles should be large enough to allow for opening and closing the book without cracking

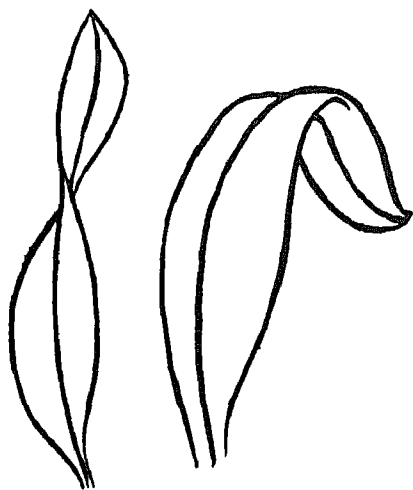
These various processes should not be hurried. It is possible that the whole lesson may not be completed at one sitting, the final pasting down of the end papers may be left for another lesson

XXVII. DRAWING FROM NATURE—PENCIL

Introduction.—The last lesson in nature drawing was occupied by the arrangement and planning of sprays with the aid of paper "finders" This practice of using a "finder" should be continued, for it is a valuable aid to most forms of drawing As we develop our drawing exercises on the representation of sprays of foliage we find that the usual treatment of leaf forms is insufficient for our purpose The leaves take natural positions which involve foreshortening. However simple the spray, this foreshortening must be studied before we can make a truthful drawing or appreciate the beauty and rhythm of its lines Before attempting to draw the actual spray we will make a few experiments with paper. Coloured paper should be used if possible.

Exercise 1.—The children will first cut a strip of paper about 4 in long and 1 in. wide and draw a line through the middle of the strip on both of its sides. Wind the strip round the forefinger once and place it on the desk beside the drawing book. It is now curved and twisted, as shown in the accompanying sketch, A Observe carefully the shape of the pencil line on the strip and draw it Now notice in the same way the edge of the strip nearest to you Draw that, noting where the curves cross each other. Finally, draw the edge farthest away. Join the ends, and compare the drawing with the curled paper on the desk. Look for the arched space underneath, the amount of paper showing on top and the amount below. The advantage of using coloured paper will here be obvious. Now cut the ends of the strip to a point to represent a simple leaf shape. (Sketch B) Hold each end in the fingers and give it a twist across its length. (Sketch C.) Fix this new shape in an upright position. It will stand up between the blades of a penknife or where the lid of a pencil box closes. In this new position draw the pencil line or midrib. Now, as before, draw the curved lines

A Bent Strip of Paper

B Paper Cut into a Leaf Shape

Drawing from Nature—Pencil

1 Aspidistra 2 Horse-radish 3 Tulip 4 Beech 5 Iris

C Paper Shapes of Leaves

representing the edges of the leaf just as they appear in relation to the midrib Draw the paper model in various positions, getting as much practice as possible New leaf shapes can be cut and drawn in preparation for the true representation of leaf forms

Exercise 2.—Procure some large leaves of simple outline and place them in position before the class The specimens can be supported in a lump of clay and placed before a white background The following leaves are suggested as useful examples—the aspidistra, horse-radish, tulip, iris and leek. These are large and in their mature forms provide excellent practice for drawing

XXVIII. DRAWING FROM MEMORY—PENCIL

Introduction.—The following lesson is an exercise in drawing from dictation It will test the children's memory of direction, length, etc, and at the same time produce an interesting result. The whole drawing is to be executed without mechanical aids

Exercise 1.—Dictate as follows·

(*a*) About 2 in. from the bottom of your book draw a level line 4 in. long, leaving equal spaces at the sides of your book

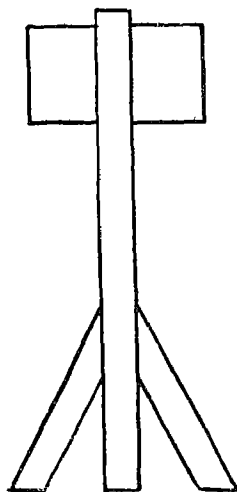
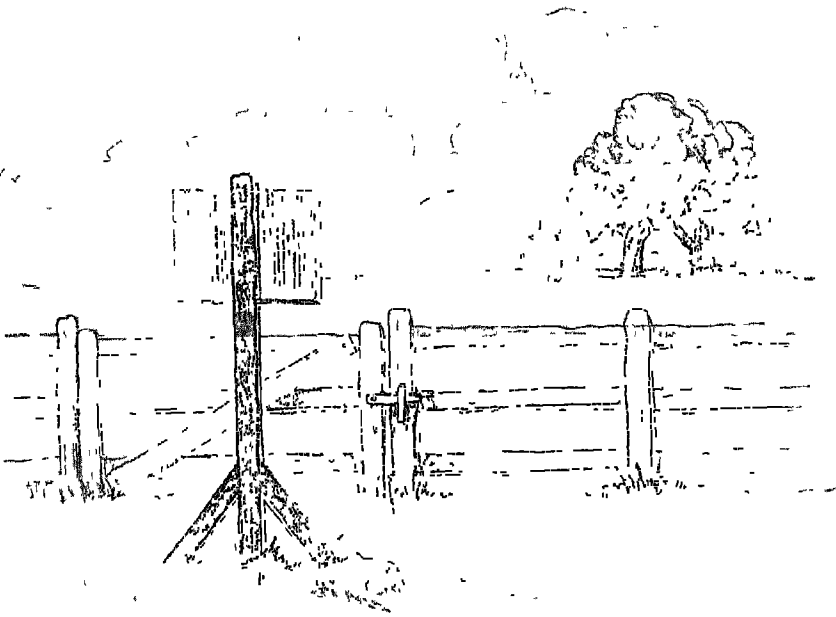
(*b*) Halve the line, and mark to the right ¼ in, then 1 in, then ½ in Repeat these measurements to the left.

(*c*) At the ¼ in marks, draw 2 upright lines 7 in long Join the tops of these lines

(*d*) On these upright lines starting from the bottom mark first 1½ in and ¾ in, then 3 in. and lastly 1½ in.

(*e*) Join the first inch point on the level line to the first 1½ in point on the upright line. Do this also on the opposite side

(*f*) Now join the outside point on the level line to the second ¾ in. point on the upright line Repeat on the other side

(*g*) Through the two points ¼ in from the top draw a level line 1 in on each side of the uprights

Notice Board

A MEMORY DRAWING

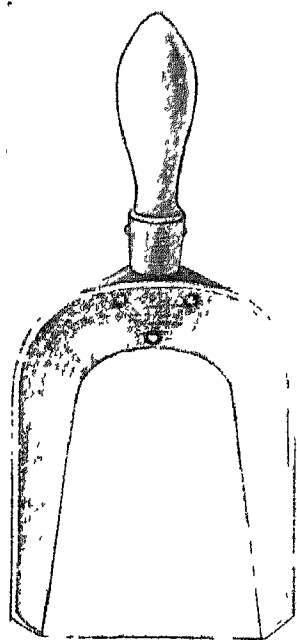
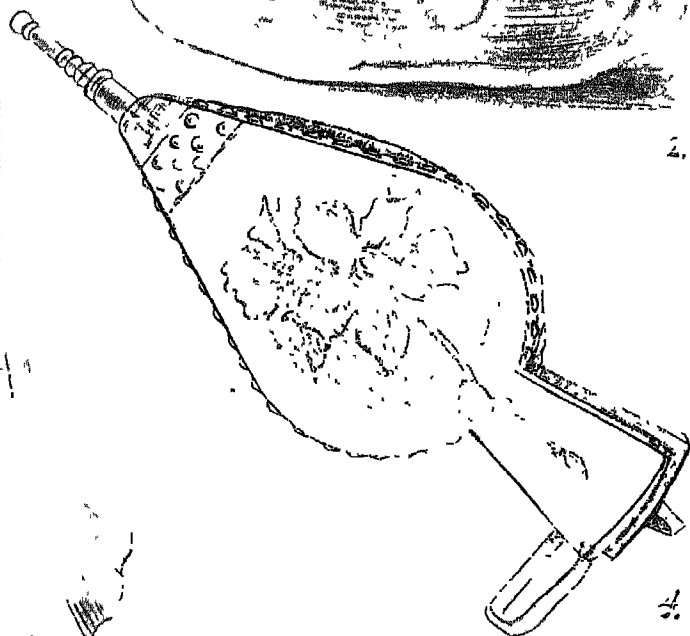
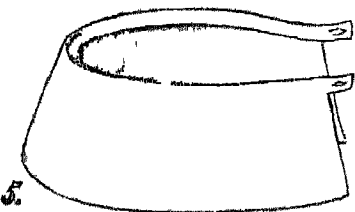
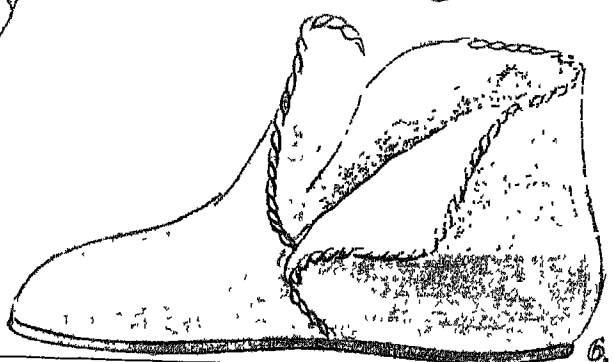
(*h*) Repeat this at the two points $1\frac{1}{2}$ in below Join their ends.

Few questions will be necessary to elicit what this drawing represents Where have you seen a board like this? Was it facing a road, field, or wood?

Exercise 2.—Having learnt how to represent the notice board, the children will remember its usual position and surroundings Ask them to sketch a smaller copy of the board and then draw something to suggest where it is Let the effort be entirely their own, as the mental images pictured should be individual.

XXIX. OBJECT DRAWING—PENCIL

Introduction.—The course has developed from the simple line addition to flat shapes, to the shapes themselves, and on to various objects combining them These in turn have led to the drawing of three dimensioned objects of the simplest forms, chiefly by the method of using coloured shapes. It is proposed, therefore, that the teaching shall now be consolidated by the careful selection of objects for drawing These will be graded in three exercises, and they should be drawn on a medium scale, so that observation can be expressed with facility

Exercise 1.—The objects selected for this exercise are mainly flat in appearance and

OBJECT DRAWING—PENCIL

1 Shovel 2 Loaf 3 Shell 4 Bellows 5 Collar 6 Slipper

require little addition to indicate slight thickness. The objects suggested are a chopper, a hand bag, a mirror, a kitchen shovel, and a loaf Any one of these objects will serve the teacher's purpose, and should be presented close against a light background The children will have no preliminary instruction, but will make their drawings entirely by their own efforts. Note the children's methods of planning and judging proportions, and also the quality of their line work. These points will illustrate the effectiveness of the teaching

Exercise 2.—The objects chosen for this exercise will be of a more definite shape, and demand a little more care in representation. They may be chosen from the following—a satchel, an envelope, a large sheet of paper with a corner turned up, a fan, a hammer, a trowel, a cricket bat, a vegetable marrow, a scallop shell and a pair of bellows. It will be seen that the list supplies a variety of shapes already taken in the course. These shapes also admit of greater detail than was required in the previous exercises; thus the drawings made should illustrate the stage which the objects represent, and the teacher will note the efforts made to express that advance. Some children will endeavour to show texture, and this should be permitted There will be time and opportunity later to correct technical errors, but if the pupils express what they see and feel, a great end is being gained.

Exercise 3.—Our next example will require the children to express their perception of length, breadth and thickness by the use of coloured papers and coloured shapes The children should be keen and alert in their recognition of dimensional shapes. Familiar objects should be chosen for study in this connection. A list is appended from which the teacher may select—a pot of marmalade (with cover), a flower pot, a thermos flask, a boy's collar, a coloured slipper, a paint can, a circular basket, a greengrocer's measure, a scout's hat and an electric lamp shade. Any one of these objects will serve to revise and test the children's knowledge, and the teacher will be enabled to assess the general ability of the class to cope with the requirements of the course at this stage The drawings should be made on one page, placed in shapes and numbered. Copies really representing the gradual development of instruction should be preserved and exhibited, for they express the fundamentals of the course, and form a sound basis for future training.

XXX. "SNAPSHOT" DRAWING—COLOUR

Introduction.—The children have now sufficiently developed colour sense and colour arrangement to encourage the hope that the use of colour will greatly enhance their efforts in imaginative work. Our earliest imaginings are often associated with glowing colour These impressions, however, are rarely well defined; they are largely confined to the halcyon period of our infancy. It is something of this colourful imagination—this aura around common things—that we wish to recapture, and if possible to express. Imaginative drawing, apart from colour, lacks something which the child experiences and longs to represent. For these reasons development is suggested along lines similar to those used in primary schools on the Continent Suggest to the children that they are to illustrate a garden of their own fancy—a garden bright with flowers. There are so many flowers, and their colours are so various, that they present patterns to

the eye Tell the children to imagine such a garden patterned with flowers and to make their picture of it

The class can be reminded of former arrangements of cut-outs into patterns, and told to think of the flower shapes and colours as cut-outs, and use them accordingly The children should be left to devise the garden for themselves from their imagination, the teacher merely encouraging neat and clean work. Careful drawing is most necessary in order that the final effect shall be clean cut and pleasing Children soon become disappointed if they are allowed to produce untidy and slovenly imaginative drawing, for the result does not correspond to their ideal On the other hand, where careful and neat work in good colour has been possible, the most surprising results have been obtained

Time does not permit a second exercise to be done in one lesson, but as an alternative the children would enjoy making an imaginative drawing of the sands by the seashore. A thousand gems of colour will be suggested by pebbles, shells, weed, starfish, pools, etc., all these objects present a wonderful pattern to the eye of the imagination Attractive figures of children in harmonious colours can be added to the scene to supply additional pleasure and interest in the picture

XXXI. HANDWORK—BINDING EDGES

Introduction.—The teacher will discover that the children have now had sufficient practice in cutting and folding to enable them to take the first steps in binding For this purpose it will be necessary to introduce light cardboard For the first few lessons thin tinted cardboard is best; preliminary practice in cutting and half cutting may be made with the old covers of exercise or drawing books. The children will find great pleasure in using this new material for models because of the increased stability of the finished products

For binding purposes, cut from a sheet of cartridge paper strips about ½ or ¾ in wide A line should be drawn through the middle of the strips, and the ends trimmed to give a good appearance Where it is possible or requisite, strips of linen or Duxeen may be prepared Coloured gummed paper should be used where decoration is to be carried out with an interesting colour scheme

A BINDING STRIP

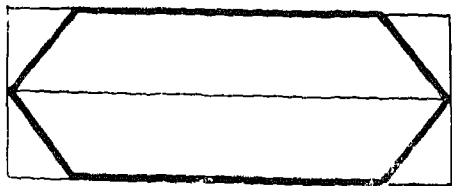
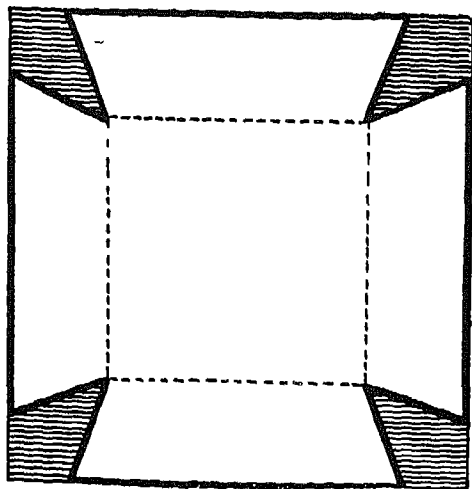
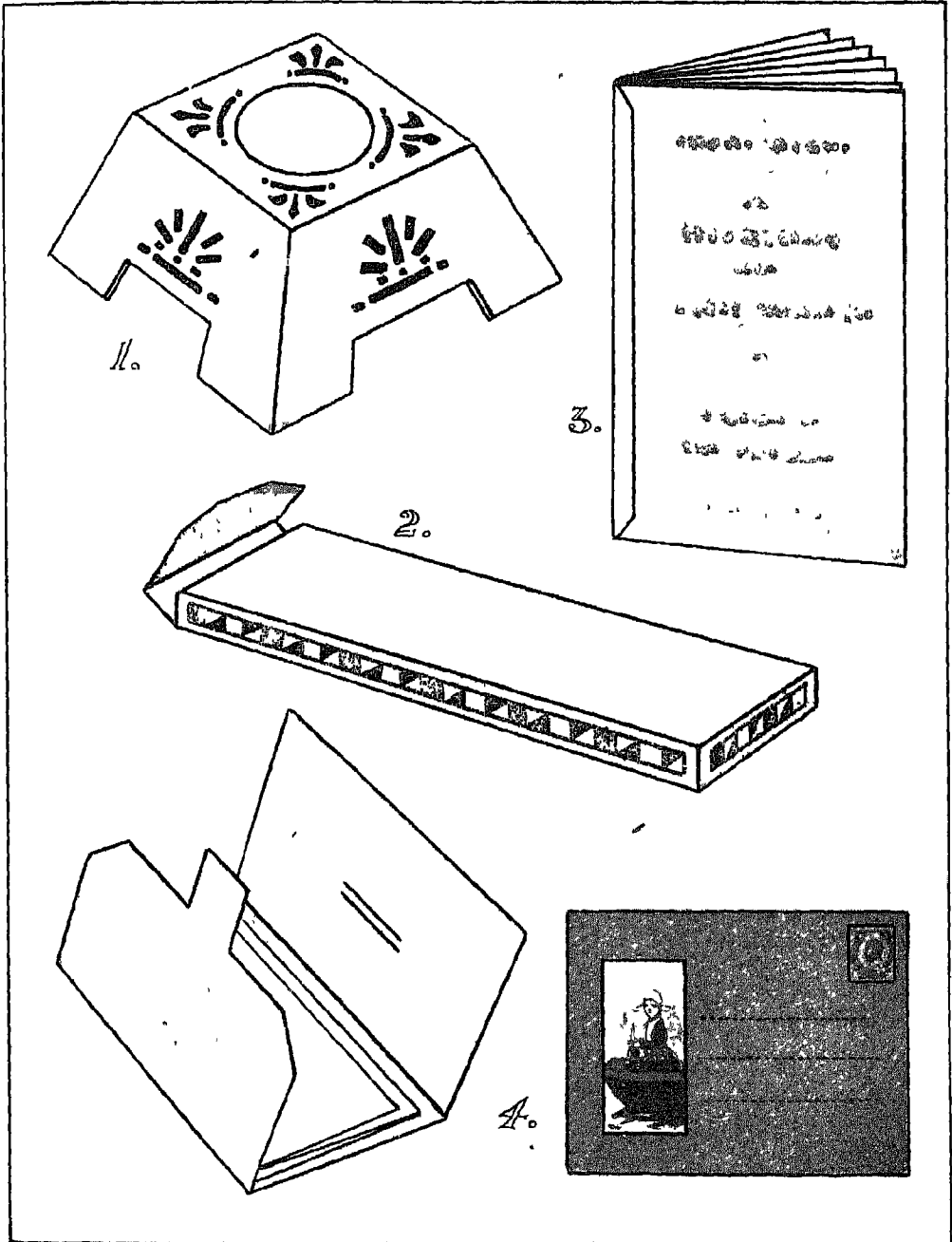
Exercise 1.—Draw a square of 5 in side with diagonals. Mark 1 in. from the centre

PLAN FOR A CARDBOARD STAND

PLATE XXXVII

HANDWORK—BINDING EDGES

1. Decorated Stand 2 Crayon Pencil Holder 3 Simple Binding of a Booklet 4 Letter Card with Decorated Cover.

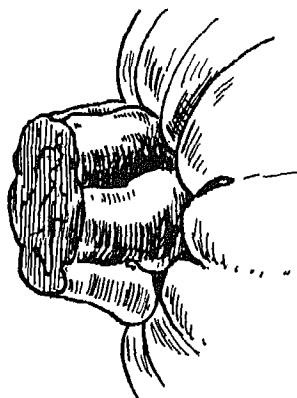
on each of the diagonals and through these points draw lines parallel to the sides, making a smaller square. From each corner of the large square mark ½ in along each side Join these points to the corners of the smaller square. Cut out the figure at each corner, and a shape like a Maltese Cross is left. From this shape a stool or stand is made by folding down the sides. The card-board should be scored or half cut on the opposite side from which it is to be bent. Now take strips equal in length to the short edges of the folds and prepare for binding. Place two edges of the model carefully together and adjust the middle of the strip to the edge. Gum neatly Continue in the same way with each corner and the model will be completed. It can be made more attractive by having shapes cut out of the sides, and by being suitably covered or coloured and ornamented with a pattern, Fig. 1. Binding and cutting exercises may be applied to any similar kind of model.

Exercise 2.—The teacher can take to pieces a disused book and distribute its sections By investigation the children will observe where the section was stitched and they will further see that it can be repaired by binding in a manner somewhat similar to that used on the models Measure a strip of thin, strong paper—typewriting paper will do—about ½ in wide and equal in length to the section Draw a line through its middle and gum one side Place the section down with its sewing edge in line with the middle of the strip Square it with a straight edge and fix cleanly, keeping the edge of the strip perfectly parallel with the edge of the section Rub the fold of the strip with the thumb nail or handle of the knife, now thoroughly gum the second half of the strip and carefully rub it down on to the cover. The section is now ready to be stitched together. This can be done in the manner suggested in a previous lesson (See Lesson XIX, page 110.)

XXXII. PASTEL DRAWING

(Colour Plate No 164 D in the portfolio)

Introduction.—Various definite shapes having been dealt with in previous lessons with pastels, it may be useful in this lesson to represent some objects of good colour which have shapes that are more or less irregular in form. A vegetable marrow is suggested for our first effort

Exercise 1.—Place a vegetable marrow in a good position before the class with a background matching the colour of the paper upon which the children will draw A light charcoal outline may be used by the children to indicate the general shape and proportion Discuss the general body colour of the marrow and ask the children to select the pastel which they will use to

Stem End of a Vegetable Marrow

represent that colour A first grade of the green should be applied to the shape, working the colour in its length as the texture sets that way. When this is done, with half-closed eyes the children should carefully observe the main lines on the marrow This is a test of observation which will show whether the children notice the connection of these main lines with the indentations on the stem For a truthful rendering, this connection must be shown, and after the children have made the effort, the teacher may find it necessary to assist their observation by questions and possibly by a blackboard sketch Having shown these characteristics, the general texture of the object can be attempted. This will be an exercise in colour grading in yellows and greens and should not present any great difficulty (See Fig. 1 on the Colour Plate.)

Exercise 2.—A tea cosy of simple colour design will make a good copy. It will not present any structural difficulties and can be planned by drawing the leading lines in charcoal The children will note the shapes suggestive of a semicircle with an ellipse for a base line As before, the general colour will be put down in first grade, and the additions for tone values made. If the cosy is decorated by bands of colour or other patterns, these should be suggested by the charcoal sketch and treated separately. Much, however, depends on the article chosen, and the teacher should use one that demands only broad and simple treatment, Fig 2.

Other objects which would be useful in connection with an exercise of this kind are—a loaf, a sugar bag, a stick of rhubarb, a soft hat and a potato

XXXIII. BRUSHWORK AND PATTERN MAKING

(Colour Plate No. 164 B in the portfolio)

Preparation.—Besides the usual requisites for the brushwork lesson, obtain a few orange-coloured papers together with orange-coloured objects These may be flowers—nasturtiums or marigolds—ribbons, or a pot of orange marmalade. A short exercise on colour selection can be given orally, the children discovering tints and tones of the colour by comparison with the papers. From their colour blending exercise in pastel they will realise why orange is sometimes biased towards yellow and at other times towards red It is useful to observe this predomination for the purpose of mixing The children can make a mixture of chrome yellow and crimson lake with as little predomination as possible, so that a pure orange colour results A coloured paper of true value should be shown to assist their colour blending Having made their secondary colour, they should now set out their colour scale as before, keeping the prepared colour for the key to the scale. This will not be extensive, Fig 1. For purposes of instruction let the children suggest articles, the colours of which seem to match the colours of their scale

Exercise 1.—Display before the class an orange of a good colour and ask the children to choose on their scale the colour which most closely resembles that of the orange. They can now make a circular shape lightly with their pencils. Remind the children to make the shape of a suitable size, as they tend to draw from nature to a small scale

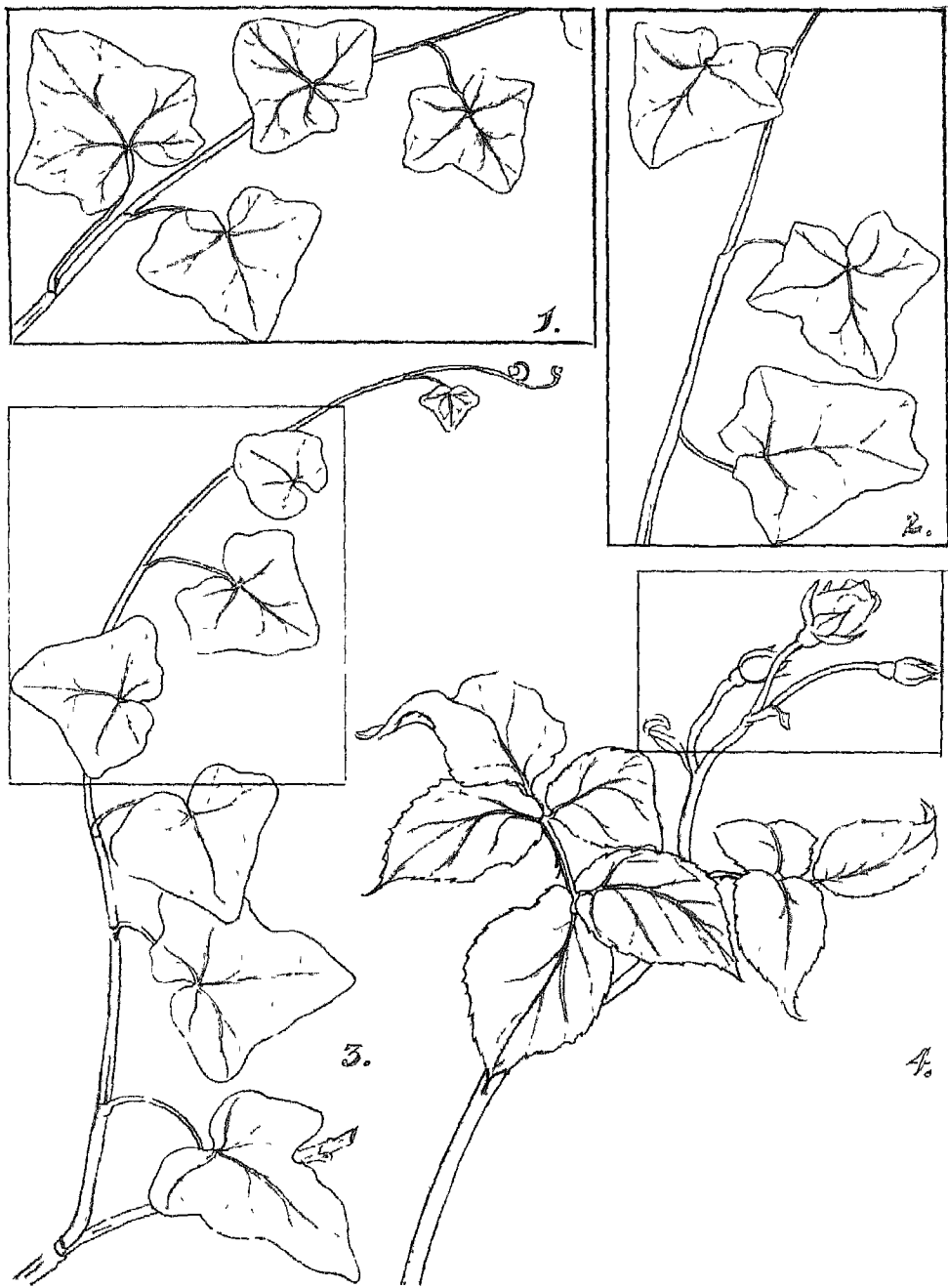
Having decided on the colour to be applied, they can place a wash of good body colour on their shape, moving the brush in sweeping curves to form the outline of the orange Now draw attention to the orange and ask the class to look at it carefully with half-closed eyes, trying to see any tints or tones of orange, where they appear to be, and to which colour on their scale they correspond They can first suggest the tints by preparing and applying the colour selected by themselves Sufficient water must be used to allow the tint to grade to the colour of the orange. Similar practice can be made with the tones, and so the appearance of mass and roundness is obtained, Fig. 2 The children can afterwards add such effects as they feel necessary, for in this way the more promising children can be encouraged to go forward, while the purpose of the lesson to have an exercise on colour selection and colour values has been attained

Exercise 2.—The children are now able to select a wash from the scale they have made and can prepare a shape for that purpose, Fig 3 With paper cut-outs (blue or black) they can experiment and devise a pattern When they have arrived at one which satisfies them, let them fasten down their cut-outs. Supervise the pattern making, giving the children freedom to make their own arrangement and permitting them to complete it when it is orderly and neat.

A further exercise may be taken by painting the shape of a tray. The colour scheme should be simple and strong, with no design to copy, Fig 4. If a suitable tray cannot be found, coloured papers or white paper washed with colour can be pasted temporarily on the top of a tray.

XXXIV. DRAWING FROM NATURE—PENCIL

Introduction.—Having studied the position and drawing of leaves when foreshortened, the drawing of a simple spray expressing this position will form our present lesson.

Exercise 1.—Tree ivy is easy to obtain, and each child should have a small spray which should be supported or suspended in a natural position against white paper. Pellets of plasticine make good supports for sprays and flowers The children should use their paper "finders," and by their aid discover the best view of the spray, noting particularly the position of the stem, and the direction of the long leaf stems and midribs. Let the children decide, after experimenting with their "finders," whether the enclosing rectangle should be upright or lengthwise. Having drawn the required rectangle let them plan on the paper what they have seen through the "finder." They should then draw the first plan, checking it by viewing their spray as before When the leading lines and spaces are satisfactory, the drawing of the leaf shapes may be made. The leaf has been previously studied and should be easily drawn unless it is much foreshortened In the case of foreshortening, remind the children to draw the leaf edge in relation to the midrib, using the resulting shapes to aid their drawing. To ensure good position for leaves which have long stems, and to test spaces, the "finders" should again be used The mechanical aid at this stage is very valuable, not only for giving the complete view of the spray in a definitely related position, but also for suggesting some sense of design in the choice of position. The training acquired by this selection of arrangement should be utilised to the fullest extent, Figs 1 and 2

DRAWING FROM NATURE—PENCIL

1 Spray of Ivy through "Finder"—First Position 2 Second Position
3 Selection made by use of the "Finder" 4 Spray of Rose Buds through "Finder"

Exercise 2.—As a further aid to the practice made in the last exercise, useful and interesting experiments may be made with the help of a large spray suspended against a white paper pinned to the blackboard in full view of the class. Ask the children to use their "finders" and test various parts of the spray to find interesting specimens. If the shapes of the "finders" are varied by cutting or careful tearing, other and more interesting positions will be found The children can then draw a rectangle of similar proportion to that of their "finder" and indicate the leading lines of the part of the spray chosen. A few experiments of this kind will reveal to the children beauty and rhythm in every part of the large spray; moreover, they will feel encouraged on finding in nature many things hitherto unsuspected by them.

XXXV. HANDWORK—A WRITING CASE

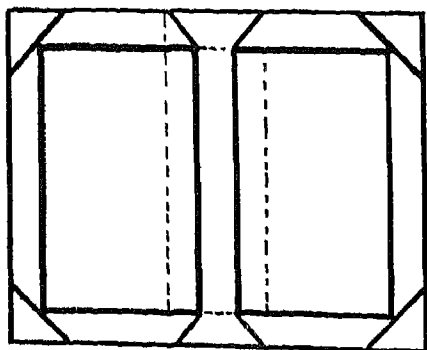
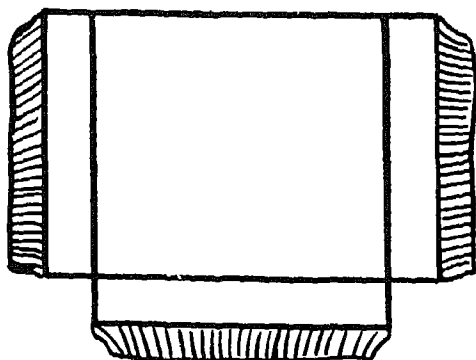
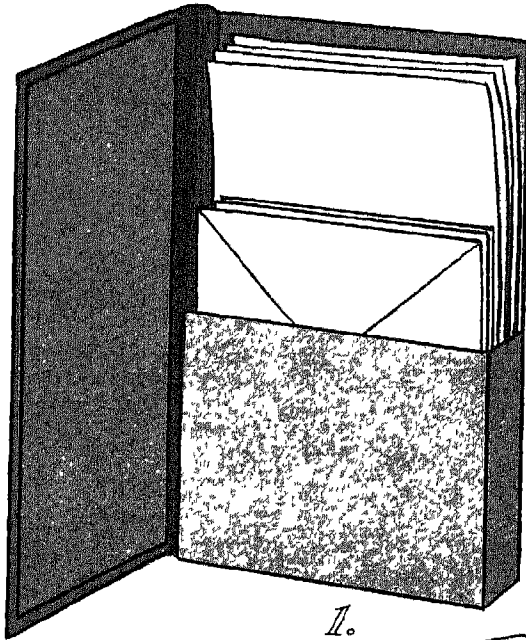
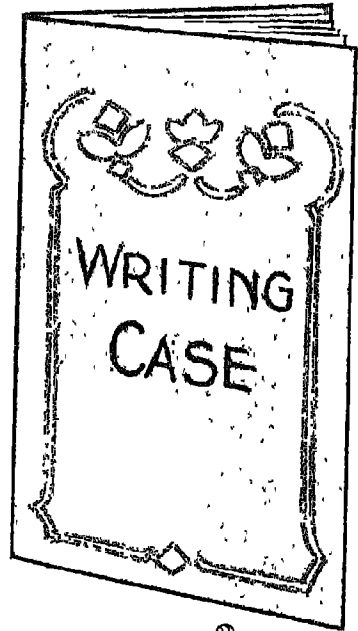
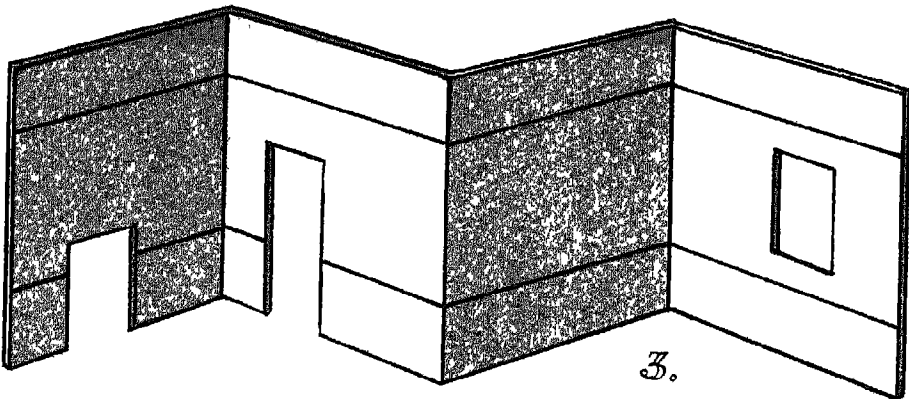
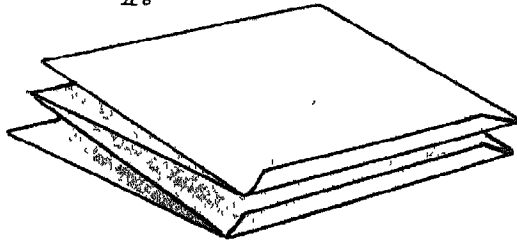
Introduction.—A serviceable writing case for paper and envelopes, complete with a blotter, can be constructed from old book covers or fairly stiff cardboard For this purpose bookbinding cloth or Duxeen is preferable, but it is probably too expensive for class work. In place of this a strong tinted paper can be made to serve the purpose The size of the paper required can be discovered by the application of the covers to its surface, leaving 1 in. between the covers and 1 in round the outside edges. (See Sketch A) It will be wise to place a fairly wide strip of the strong paper between the covers to provide a good backing. This should be gummed at once, after which the covers should be fastened in position as shown by rectangles corresponding to their shape. While the gum on the covers is drying, a pocket should be prepared for the left-hand side of the writing case The pocket can be constructed from a rectangle as wide as the book cover and half its length. Strips ½ in long will be added for the sides and bottom, with flaps for fixing. Before the pocket is fixed, the cover on which it is to be placed must be made neat by a covering of tinted paper to match the blotting paper which is to be used on the opposite side Having prepared this shape (Sketch B), bind the whole by folding and fixing the covering surface edges These edges will now be covered on the left-hand side by blotting paper fastened down with gum,

A Plan of a Writing Case

B Pocket for the Writing Case

Plate XXXIX

Handwork—A Writing Case

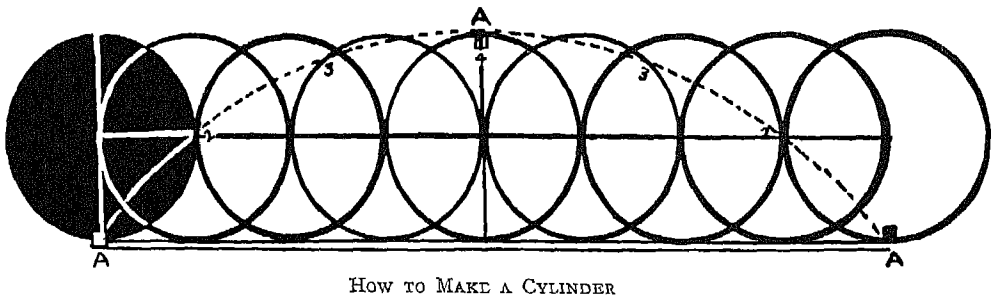
1 Writing Case 2 Decorated Cover of Case 3 Development of the Walls of a Room.

and on the right-hand side by the shape already prepared The model is now ready for the pocket Fold the half-inch strips squarely down and fold the flaps under. First gum the bottom flap in line with the cardboard cover, then bring the sides carefully into line with the sides of the cover, and gum neatly. The case, when dry, will be ready for the application of patterns or designs in colour and can be made attractive and useful, Figs 1 and 2

Another exercise is provided by constructing the development of the walls of a room Cardboard measured to an easy scale can be cut to represent the walls of a room On the cards should be shown small rectangles to indicate the door, fireplace and window, which should also be drawn to scale These spaces should be carefully cut out and the four rectangles joined together with binding strips. If bound with binding tape the whole shape can be made to fold without becoming detached. The construction and use of such a model is of the greatest assistance in problems relating to the mensuration of a room Many questions connected with area and the prices of wallpapers, etc, can be applied to it during an arithmetic lesson, Fig 3

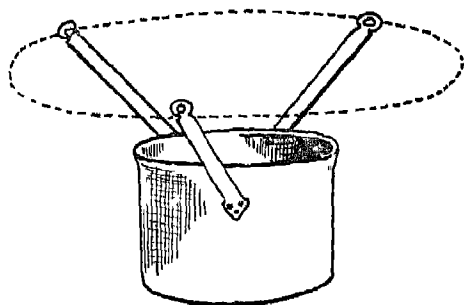
XXXVI. BRUSHWORK—CYLINDERS

(Colour Plate No. 165 A in the portfolio).

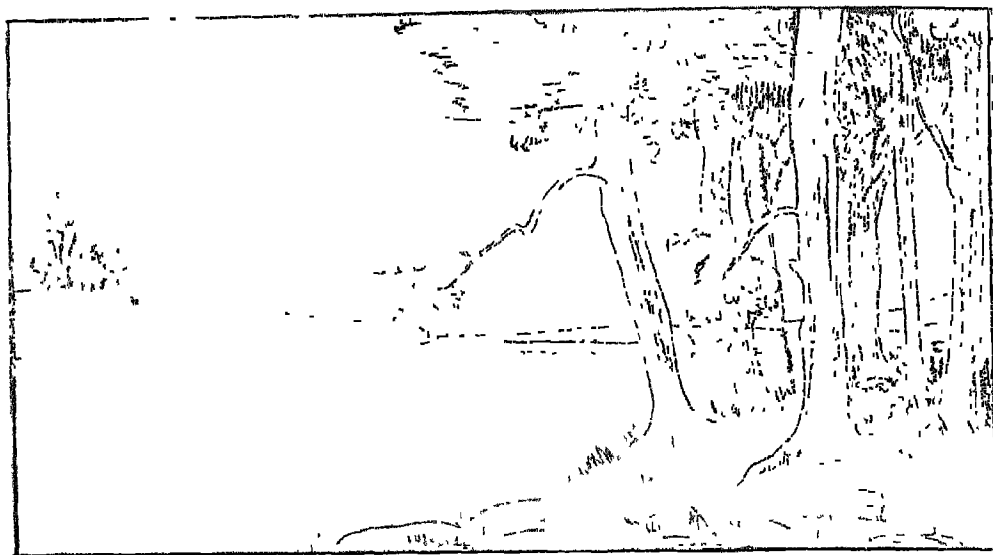
HOW TO MAKE A CYLINDER

Handwork preparation.—For the purpose of assisting in the recognition of shapes when three dimensions are suggested, the following exercise proves useful The principles of perspective are too involved to introduce here, and the difficulty can be fairly met where the children are taught to make use of their colour perceptions, so that new planes are viewed as colour shapes. For this purpose it is proposed to construct a cylinder in stiff paper or cardboard The usual implements for cutting out will be required In addition, the children should each have a circular disc or ring—a penny, a round lid or a curtain ring

Exercise 1.—Draw a horizontal line on the paper, placing the disc upright at one end of the line Place a mark on the disc where it touches the line, then carefully roll it over until the mark comes back to the line Place a pencil dot at this point, which marks the length of the rectangle At the ends of the line draw lines 2 in long at right angles and join their ends to complete the rectangle Place the disc on the top line

and pencil its outline, and exactly opposite on the base line repeat the pencil outline of the disc On one end of the rectangle draw a flap ¼ in. wide. Small flaps must be added to the circles, and with gum or Gloy the cylinder can be formed When this has been neatly done, paint the top and bottom yellow and the surface red. This model will serve to illustrate colour shapes and also colour grading caused by the turning of the surface from the source of light Brush practice with the varying appearance of the top, as the cylinder is raised or lowered, will be a useful preparation for the next exercise.

Exercise 2.—A coloured saucepan will illustrate the cylindrical shape. The children can manage the elliptical appearance of the circular top by using the brush directly This is necessary, as they will look at it as a colour shape and put it down as such They will not all be successful at first, but the effort made to express the shape which they see constitutes the value of the exercise The colour will probably be a tint of light ochre. The body of the saucepan—blue—will offer little difficulty, as the ellipse shape will be a safe guide A few questions as to the bottom circular shape of the saucepan will explain the blue curved line. The handle can be placed in position also as a shape. The teacher will perhaps need to indicate that, whatever the position of the handle, it points to the centre of the saucepan.

The Handle of the Saucepan Moves in an Ellipse

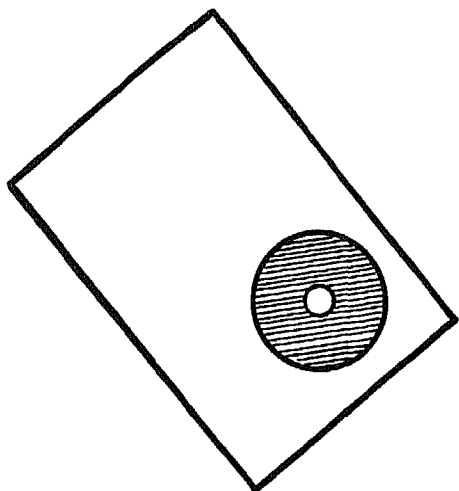
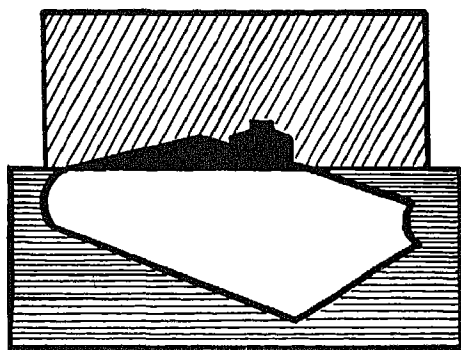
Exercise 3.—As a further exercise, a toy drum may be used The same methods for rendering the general shape will apply, and in both exercises in this lesson the method of grading the colour will be adopted which was formerly used in the colour scales. Other suitable objects for this lesson are jugs (upright or hanging), paint cans and tambourines.

THIRD YEAR'S COURSE OF DRAWING AND HANDWORK

Introduction.—The main lines of the general course of instruction in drawing will be continued in this year The Third Year's Course will provide for a general advancement in the work, but a good deal of the instruction will consist of a revision of much that has been taught during the two previous years Many of the principles taught reappear in new and more difficult forms. Emphasis continues to be laid on the importance of training children to observe *shapes*, and to endeavour to represent such shapes as they observe them The difficulties attendant on the teaching of perspective can be almost entirely eliminated if the shapes of the various parts of objects are faithfully represented. Let children learn to look at a box, for example, as an object with three shapes—the two sides and the top, let them draw, preferably in flat colour wash, exactly what they see, and they will have little difficulty in presenting a fairly good copy of the box Purely objective drawing will occupy a place in the scheme, but will be less a feature than colour work applied to pattern making, handwork and art occupation It is desirable to foster and make use of the innate love of colour so strongly characteristic of children, and to secure an expression of it which will prove of practical value in later years Comparatively few adults make use of objective drawing, as such, but discrimination in pattern and colour becomes increasingly a part of our daily routine as we make our choice of attire, respond to the invitations of the window-dresser, arrange the details for home and garden, and consider the beauties of our own or our holiday surroundings. With this comprehensive aim in mind, the work of the teacher is invested with new interest and with a far-reaching and effective purpose. To this end the teacher is invited to make the fullest possible use of the scheme, either selecting those parts which meet his particular requirements, or, if possible, covering the whole field of the course.

I. THE USE OF BACKGROUNDS—PASTEL

(Colour Plate No. 166 C in the portfolio)

Introduction.—It is suggested that a coloured background and foreground should be introduced when presenting objects for pastel drawing, as these give a clearer definition of the object, ensure a more accurate observation of shape, and add greater interest to the work A further useful aid to correct placing (especially if more than one object is used) is to encourage the children to show plans and elevations as a preliminary step in making their colour drawings. This also assists perspective representation and the perception of length, breadth and thickness

Exercise.—Place a blue book flat on the foreground and stand a stone ink bottle upon it: the background may be red and the foreground green, as though the objects were placed on a table covered with a green baize cloth against a red wallpaper, Fig. I on the Colour Plate On a piece of spare paper let the children draw a level line to show where the red background meets the green foreground. Below that line the children may show the shape of the book and the bottle as they appear, and also in the position as seen from above The teacher should enquire why the objects should be placed below the line If the children are allowed to view the objects from above, they will clearly see the book shape cut out of the green space, and, what is very important, they will see its position with regard to the line which divides the red from the green. This method of presenting the objects should correct the common fault of placing objects across the line of division. By a quick sketch on the blackboard the teacher can indicate the position of the book as seen from above The proper placing of the bottle on the book will be similarly represented The children will see (with half closed eyes) what shape is cut out of the red by the book and bottle With a little practice on their spare paper the children should manage to outline this shape, and should then be able to make a charcoal drawing of the group. Around the part of the group cutting out the red, they should

PLAN OF BOOK AND BOTTLE

SILHOUETTES OF BOOK AND BOTTLE

indicate a surround of red, this should not be applied heavily, it is used merely to define the shape seen The foreground may be indicated by a light use of the green pastel The book and bottle may now be coloured in the usual way. The light blue of the top of the book will be contrasted with the darker colour of the back and the edges of the leaves. The bottle will offer little difficulty as it is a simple brown shape varied only by the effect of light, Fig 1.

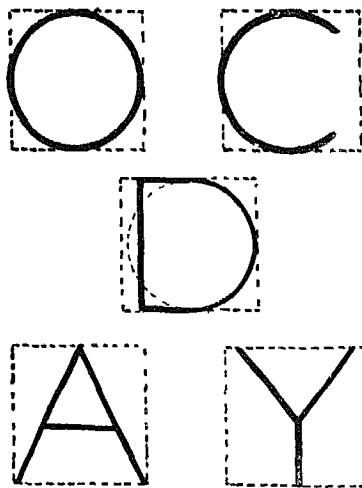
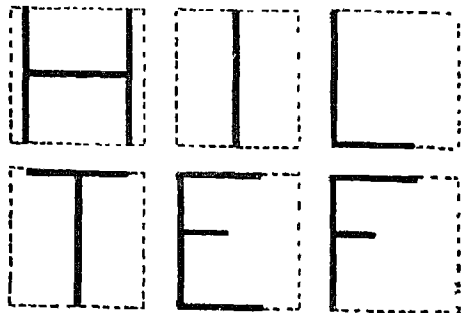
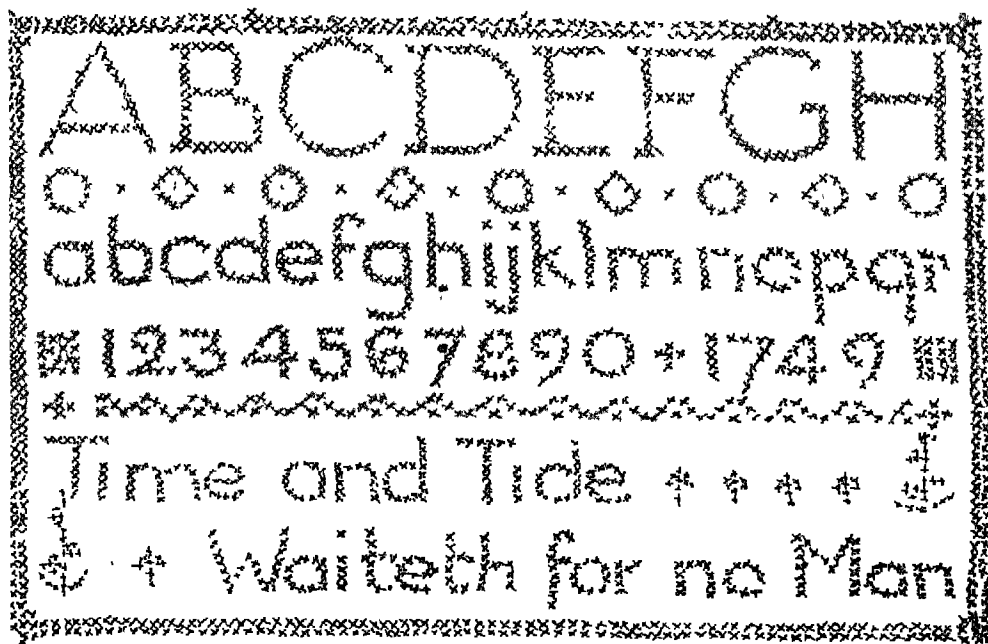
Other simple exercises are a cap and a cricket ball, and a biscuit packet with a ginger beer bottle, Figs 2 and 3

II. LETTERING—PENCIL AND PEN

Introduction.—Excellent practice in pencil drawing is afforded by plain lettering. A few exercises in drawing simple line letters will prepare the children for instruction in lettering with a slant-pen at a later stage The purpose here is to consider the drawing of good letter forms, to note carefully the general shape which suggests letter construction, and to give practice in the correct spacing which is vital to the good appearance of letters Most children have some knowledge of script letters, and upon this knowledge we can frame our instruction.

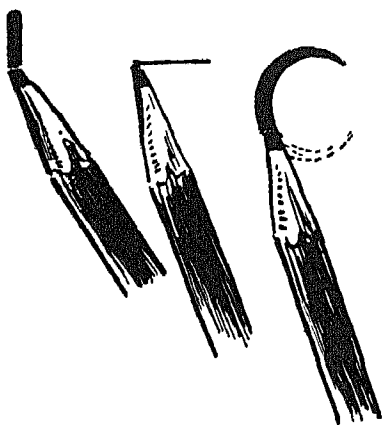
Exercise 1.—By the use of the blackboard the teacher will first illustrate some of the simpler straight line capitals—H, I, L, T, E, F. These should be drawn with as much care as possible between two level lines. The children should draw similar lines $\frac{3}{4}$ in. apart, and between them practise a series of upright strokes until they become proficient.

The teacher will enquire what shape is suggested by the general appearance of each of these letters. The children will easily discover that each one is contained in an approximate square With this in mind, the children can lightly draw rectangular shapes and use them to form the letters It will be seen that these letter shapes vary slightly, and thus make the design more interesting The bars, too, are arranged to satisfy spacing and please the eye

A further group of letters is suggested by the circle These are O, Q, C, D, G The circular shapes may be thought of in conjunction with the square and will be easily drawn The more difficult letters are those with slanting lines—A, V, Y, K, M, Z. Here also the square will assist us with the shape. Yet another group is supplied by B, P and R· we may compare B and R with H, and P with F for the position of the

IJIEH CDOPIS
ABCDJKLMRSPX

The four greatest names
in English poetry are
almost the first four we
come to—Chaucer, Spenser,
Shakespeare and Milton.
—Hazlitt—

LETTERING—PENCIL AND PEN

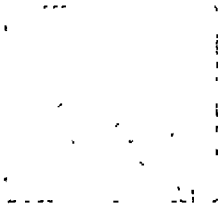
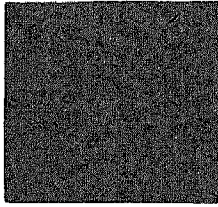
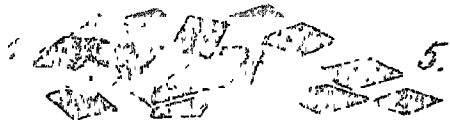
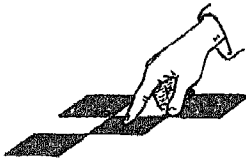
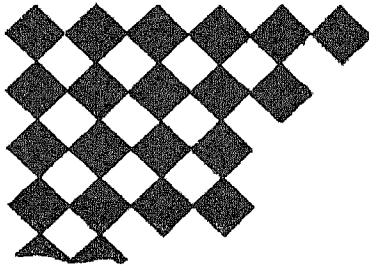
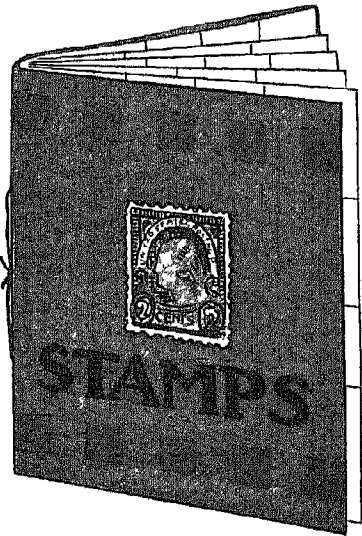
1 Sampler showing Script Writing   2 Letters drawn with a Chisel-pointed Pencil
3 Lettering done with a Broad Pen

USING A CHISEL-POINTED PENCIL

bars. S provides us with a rectangle in which two circles are placed one above the other, and the letter is formed from these circles. Having learnt the forms to the scale above, they should be practised occasionally to half the scale and grouped into simple words.

Exercise 2—Small letters can be dealt with in the same way as the capitals. The children having previously used script can print words using the capital forms where necessary. Now the pencils can be chisel-pointed and thickness can be shown where it occurs. The teacher can illustrate with square-pointed chalk how the shaped point held firmly will make the required strokes. This will be a useful preparation for the later use of pens with broad points

III. BRUSHWORK AND PATTERN MAKING

Exercise.—Supply each child with two papers, one for the pattern making and the other for the preparation of cut-outs Draw on the pattern sheet a rectangle 6 in by 2 in, and colour it with a smooth wash of light ochre (buff). The wash should be laid on horizontally and worked from left to right down to the right-hand corner, where the brush, pressed almost dry, will take up the surplus water and colour On the other sheet let the children draw a couple of 2 in. squares, and on them place washes of blue and red in good body colour. When dry these coloured squares will be cut out, folded and cut into halves: this folding and cutting will be repeated with the halves, and so on, until each child has a number of small red and blue squares. The teacher will allow the children to arrange these shapes on the pattern sheet as they choose, leaving some of the buff colour of the sheet showing between the shapes, just as they see the blue sky behind the shapes of leaves on the trees. When the children have made one pattern, they can take up the coloured shapes and make fresh experiments. Where good patterns have been secured, the children can fix their cut-outs with gum or paste. Some copies should be shown to the class, and the children asked to explain what plan was used in the pattern making—the border, repeat, alternative, etc In this way they will learn that thoughtful and orderly arrangement makes for good pattern work.

Art occupation.—A further and pleasing exercise can be carried out by using surplus or fresh cut-outs for the decoration of cards or books A handmade book for used postage stamps can be treated in this way. One stamp can be pasted on to the tinted cover of the book, and the coloured cut-outs arranged and fixed into a pleasing pattern. Plain lettering should be used in conjunction with the pattern. The pages can be ruled into 1 in squares, and the children will then have a pretty book for use in their geography lessons.

BRUSHWORK AND PATTERN MAKING

Figs 1 to 7 Papers coloured with Light Washes and cut out in Squares for Making Patterns
Fig 8 A Book for the Geography Lesson

IV. PENCIL DRAWING—THE SHUT-EYE METHOD

[Reproduced by courtesy of the Royal Drawing Society

"Snapshot Drawing" by Nora Unwin, age 15–16

Exercise 1.—This exercise is a continuation of the shut-eye method used in previous years Show the class a wooden hoop, holding it in such a position that it is presented to all the children as a complete circle The children should close one eye, extend the right hand and point to the rim of the hoop With the sight directed to the point of the finger, they should slowly trace the shape of the hoop in space. Now, with both eyes closed, let them continue the movement in order to feel the direction of the curve. With eyes opened they can next with their pencil trace the shape in space over their paper Then gradually they bring the pencil to the paper and draw the shape freely

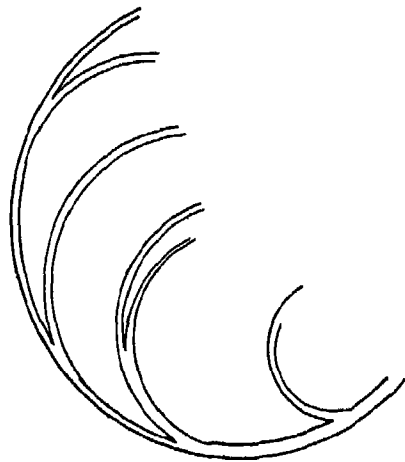
Exercise 2.—Show the hoop in a very foreshortened position, and repeat the previous exercises The hoop can be shown in both the upright and level positions By this method of tracing the shape in space, the hoop now seen as a narrow ellipse, can be drawn in one continuous line The impression gained in the first exercise by drawing the full circle will help the children to avoid the drawing of pointed ends on their ellipses.

Exercise 3.—The hoop should finally be shown with a half-turn, in order to give the children the opportunity to draw the wider sweep of the curve. The shut-eye method should be patiently followed, as the sense-impression made by its practice will be invaluable in other lessons When inspecting the results, the teacher will not look for good line work so much as for the expression of mental perception

Exercise 4.—*Direct Memory* To complete this series of short exercises, the teacher might suggest one of the following to be drawn:—a penny lying on the table, a plate on the dresser, the top of a round table; a lifebelt thrown from a boat; a water lily on a pond, and a doorway with a semicircular head Frequent practice during odd minutes should be given to the drawing of ellipses, either from memory or from objects.

V. DRAWING FROM NATURE—PENCIL

Introduction.—Some knowledge of leaf forms and sprays having been acquired in the two previous years, it will be interesting to add some simple flower forms to our drawing from nature. These forms present definite shapes which have been taught, and which involve the principle of radiation. In rural schools no difficulty will be experienced in securing specimens; in urban districts possibly only one or two can be obtained, but if these are large they will serve the purpose. Our first example is the bindweed which is to be found in every hedge, and in or near most gardens

Exercise 1.—Specimens of the wild convolvulus or bindweed should be distributed and placed on the left-hand side of the drawing book. If sufficient plants cannot be obtained the teacher can suspend a large specimen against white paper on the blackboard, and from this the children can choose a small spray with their "finders." The position of the stem and the directions of leaf joints and flower axes will first be planned This planning should be done with great care, the children noting how the curved stem and leaf joints flow with beautiful rhythm and leave definite shapes between them. The leaves suggest a triangle, and can be placed in position by their relation to the main line of the spray. It should be noted how the space shapes assist the drawing The teacher will ask the children what shape is suggested by the flower They will at once recognise the inverted cone Let them discover the axis of the flower, and draw the ellipse shape across its end at right angles Leading from this ellipse is the tube of the flower, which flows in a gentle curve to the cuplike calyx formed by little pointed leaves. The flower can be completed by thin pencil lines suggesting the variations on the curve of the ellipse and the delicate lines flowing towards the calyx If there are buds on the spray, the drawing of them

RHYTHMICAL CURVES OF A PLANT STEM

DRAWING FROM NATURE—PENCIL

1 Wild Convolvulus 2 Gaillardia 3 Centaurea 4 Coreopsis

will provide an excellent test of observation This plant not only suggests beautiful form and rhythm, but its delicate appearance requires neat and clean line work in the drawing The children have now had sufficient practice in nature drawing to give them ability to express these new perceptions of plant form.

Exercise 2.—Flowers belonging to the daisy family, preferably those of the larger variety, are excellent examples of the disc-shaped flower with ray lines (radials). The main direction of the stem should be indicated, as well as its simple leaf formations The flower will present an elliptical appearance, which is best drawn by outlining an inner ellipse for the "eye", and an outer ellipse for the position of the petal ends. The teacher might ask the children to indicate the place to which the petals point Of what do these ray lines remind us? (The sun's rays) What is the largest flower you have seen which is similar in form? (The sunflower) Draw a few of these ray lines carefully, noting that all are drawn to or from the centre. To draw the petals correctly, examine one plucked from the specimen Let the children observe the shape of the widest part, the point and the edges Encourage them to draw these parts accurately

Other suitable examples of flowers for this lesson, in addition to those shown on the Plate, are the single dahlia, the sunflower and the narcissus.

VI. HANDWORK—DECORATED BOXES

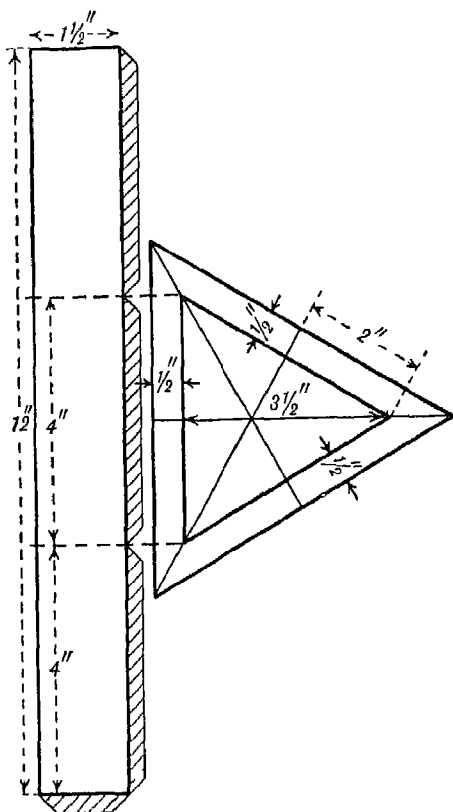
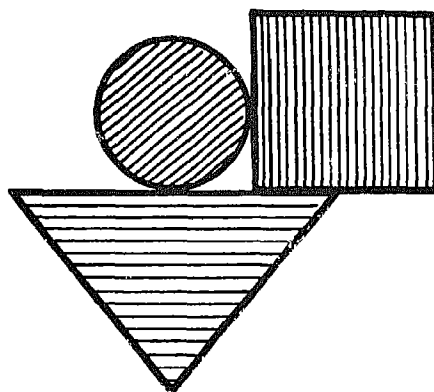
(Colour Plate No 165 C in the portfolio)

A handkerchief box.—Cardboard or stiff paper and scissors will be required for this lesson As we are to make and decorate a triangular handkerchief box the cardboard should be about one foot square. In the middle of the card draw a rectangle 12 in long and 1½ in wide; divide the long sides into three equal parts and join the points Extend these level lines ½ in beyond the right side of the rectangle, and join their ends which are 4 in apart. This is the base of an equilateral triangle which must now be drawn, either with the compasses, or by making the height of the triangle 3½ in Halve the sides of the triangle, and draw lines from each of the opposite corners through these points and ½ in. beyond the sides Through these ½ in. points draw lines parallel to the sides of the triangle until they meet to form a larger triangle on the outside of the first one (See diagram p. 148)

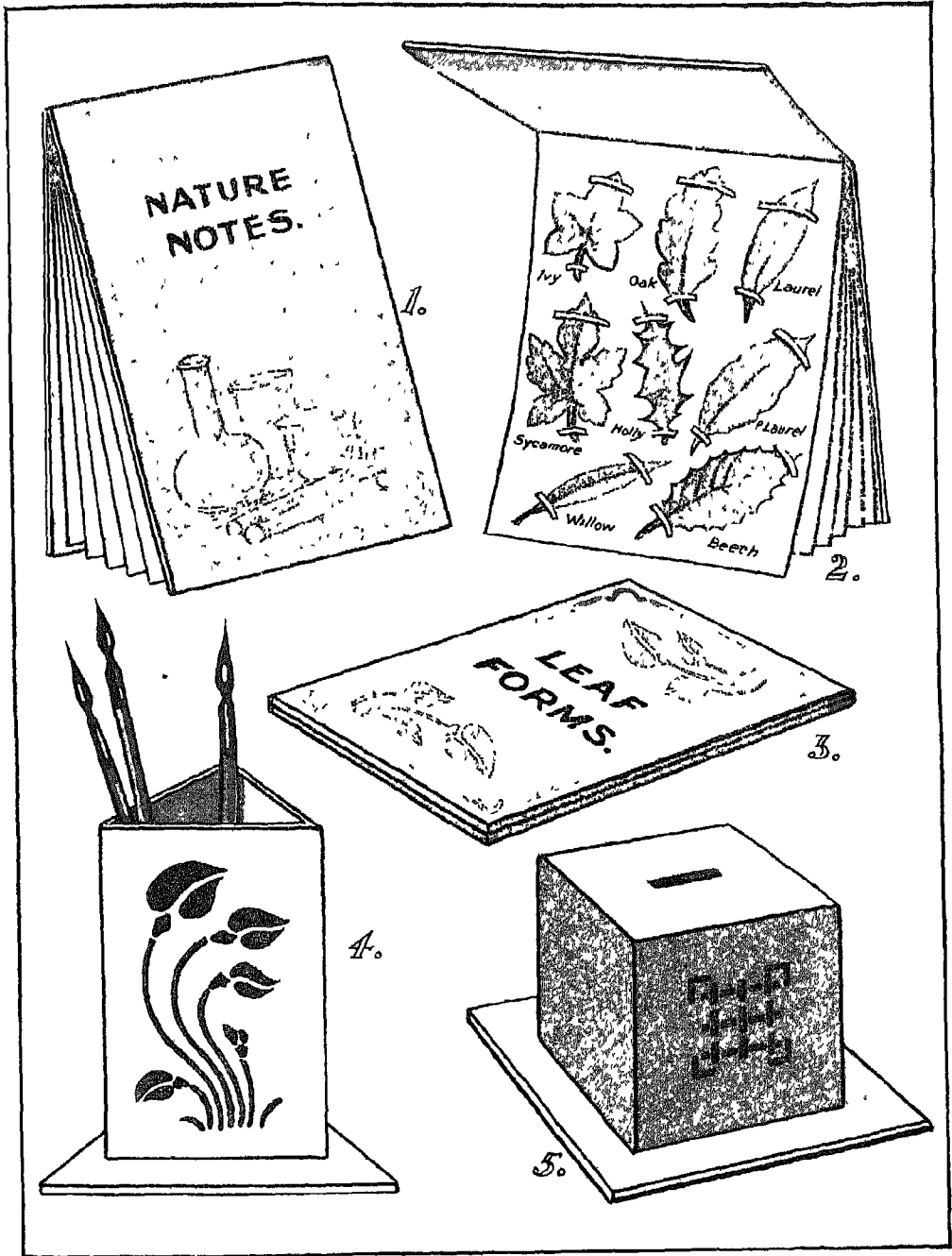
Place flaps for fastening where indicated in the diagram and cut out each shape clearly and neatly. Using the first triangle as a template, cut out a similar triangle. Having lightly scored across the dividing lines, fold the rectangle to make a triangular band. This when placed on one of the triangular shapes should exactly fit the inner pencil lines, test it, and then fasten it down with strips To complete the model make a hinge of linen or Duxeen along the base line of the inner triangle on the lid Now we have made a useful box of good design and shall decorate it with a pleasing cover

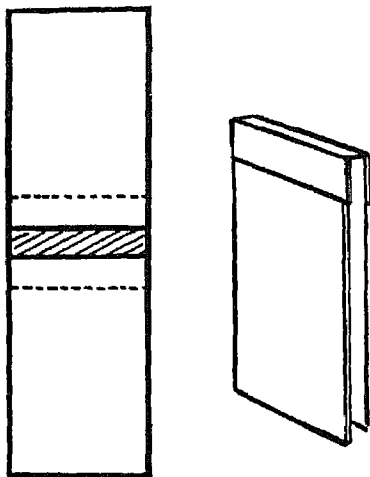
The inside of both the box and lid should be similarly washed with a good matching colour. This will cover up all traces of the gum and the fastenings. To decorate the box we shall use coloured paper cut-outs Every child should have an old envelope in which to keep spare cut-outs, for they will often be wanted. The teacher will provide various colours from which fresh

cut-outs can be made We have, so far, usually arranged one colour in a pattern, but we shall now try to make a pattern with several shapes placed near or on each other If our box is blue we can select a colour that goes well with blue We might begin with a mauve square, a dark red circle and a green triangle. We group and plan them so that they make a good pattern, and then repeat this in different directions, so that the blue ground makes patterns too. The children should make their own colour schemes and group the cut-outs into patterns of their own choosing This development from the simple plan of using cut-outs will create great interest in pattern making, and increase the sense of colour harmony The method can be applied in a variety of forms of art occupation.

Envelopes for coloured cut-outs might be constructed and decorated in an interesting form to express their purpose

PLAN OF A TRIANGULAR BOX

COLOURED CUT-OUTS

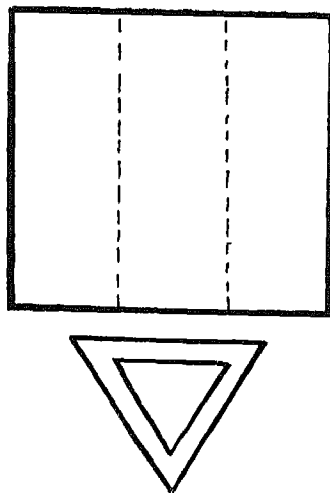
VII. HANDWORK—NOTEBOOKS AND HOLDERS

Exercise 1.—*A Notebook* Supply each child with slips of foolscap paper about 5 in long by 3½ in. wide. Strips of typewriting paper should now be prepared 3½ in. long by ½ in. wide, these are used to bind the slips in pairs to make single sections, of which at least four will be required The binding must be done very carefully, and the strips must be fastened with good paste Library paste is useful, as it is less moist

Handwork—Notebooks and Holders

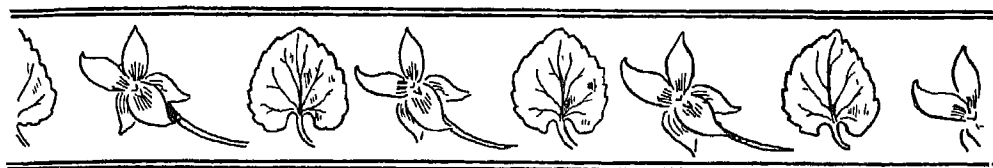
1 Book for Nature Notes 2 Book of Leaf Specimens 3 Decorated Cover of a Book
4 Holders for Pens, Pencils and Brushes 5 Money Box

Backing the Covers for the Notebook

than most other preparations. The binding must be creased smoothly and quite flat. The sections so prepared will be used to make a notebook Cardboard must now be cut to provide covers for the book, for our present purpose they will be of the same size as the sections The cardboard must first be backed with bookbinding cloth or Duxeen, which should overlap about 1 in. on each cover, leaving between the covers a space of about three thicknesses of the cardboard. This will give room for the four sections, and leave play for the movement of the covers The covers will now be complete except for a covering which can be adjusted and fixed as in the previous exercise. Care must be taken to fold cleanly against the backing. The insides of the covers will next be lined with white paper to cover the joinings All is now ready for binding the sections these should be inserted into each other and fitted exactly. Careful measurements should be made and holes pierced ready for sewing the sections into the covers: this will be done in a manner similar to that explained on page 110. The little book should now be ornamented with a pattern and descriptive lettering, Fig 1 This exercise is a first step to bookbinding, and the children should be encouraged to make many kinds of notebooks which they can use daily

Exercise 2.—To give further practice in the use of cardboard the construction of a holder for pens, pencils and brushes is suggested. The teacher should have prepared a fairly large model for the inspection of the class, and should require them to point out the stages and method of its construction This will revise the work previously done, and encourage the spirit of investigation It will be found that the triangular model is made from a rectangle divided into three parts, with a triangle for the base. By unfolding the model it will be found that instead of using flaps as in paper construction, the cardboard has been half-cut or scored for folding, and has been bound with strips at the corners. Strips, too, are used to fasten the box perpendicularly to the base It will be a good plan to let the children carry out the drawing and construction under the observation of the teacher The correct placing of the box upon the base will provide an excellent test of intelligence. The whole model should finally be washed with a good colour and decorated, Fig 4

The children will readily suggest other exercises of a similar character, such as the money box, Fig. 5.

Plan of the Holder for Pens and Pencils

VIII. BRUSHWORK—COLOUR SCALE OF VIOLET

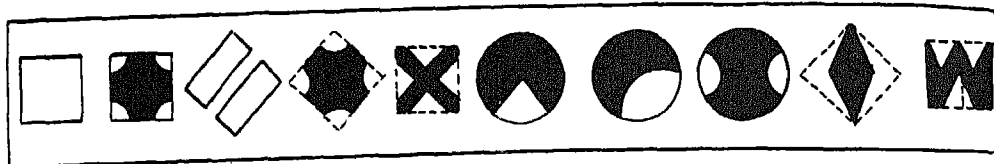
(Colour Plate No 165 B in the portfolio)

THE COMMON VIOLET

Introduction.—In this lesson the preparation of the secondary colours will be completed by the analysis of violet. The former experimental exercise should be recalled, and the children will remember the result of blending crimson lake with Prussian blue. In this lesson we shall construct our scale of violet and show its use in decorative work.

Exercise 1.—Provide each child with a small supply of crimson lake and Prussian blue, together with the necessary black and white A more subtle violet may be produced by using light red and cobalt if these colours are available; but at present we are mainly concerned with the principle of colour blending, so the two former colours will be suitable The children will now understand how to mix the colours until a good violet has been prepared on their palettes. When this is done, they can prepare their scale, starting with K (the key colour) and securing their tints and tones by the use of black and white (see Colour Plate) Little instruction should be necessary as the children have already had practice in the work, and they may be left to grade their scale and show their power of colour selection

Exercise 2.—Various flowers are suitable for the application of the colour, and, to avoid the difficulty of drawing, the teacher might make a few hectographed outlines for distribution to the class. If this plan is inconvenient, the colours can be applied directly as irregular shapes. Specimens of violet blooms should be supplied if possible, these are available during the greater part of the year The sweet pea, purple iris and Canterbury bell are also useful, as their colours conform to some part of the colour scale, Figs. 1, 2 and 3 on the Colour Plate.

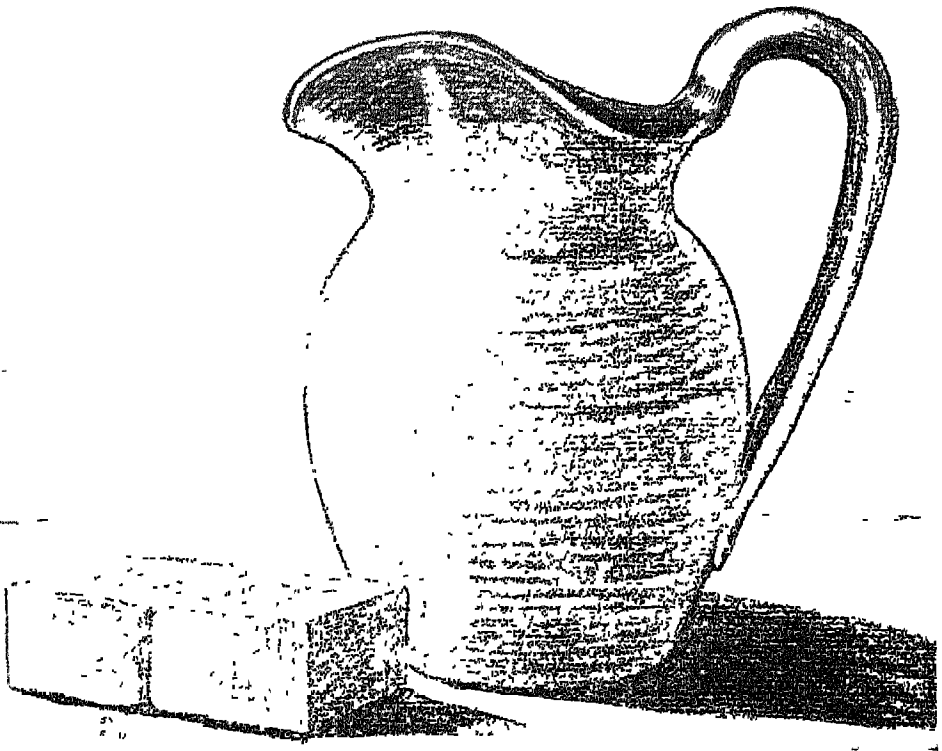
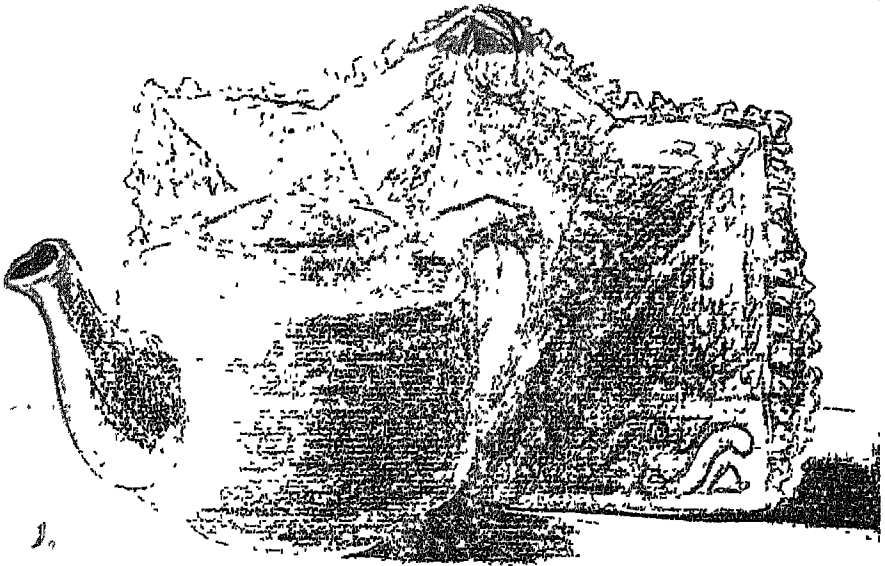
Exercise 3.—The children can draw a rectangle about 5 in long and 2 in. broad, and fill it in with a smooth wash of violet. Upon this as a background, shapes can be arranged in pattern A strong orange colour should be prepared, and this can be applied in pattern either by potato cuts or by stick printing. The latter is a simple device, and, although prepared pattern sticks can be used occasionally, it is preferable for the children to devise their own patterns. The sticks should be about 4 in long, with square or rounded ends. They can be notched and shaped into simple pattern units To obtain variety, the children can exchange with one another The orange colour should be painted on to a piece of felt or blotting paper, and the stamps should be pressed on to the colour and transferred to the pattern Experiments should be made until the stamp is working well, Fig 4.

Art occupation.—As an alternative or further exercise, the children can prepare a notebook and decorate the cover with stamped units The cover should be of stiff, tinted paper, nicely spaced for the title and pattern shape The arrangement for this may be done by the children, and the stamps applied as before; suitable lettering can be added after the decoration is completed

UNITS FOR POTATO CUTS OR STICK PRINTING

IX. THE USE OF A COLOURED BACKGROUND—PASTEL

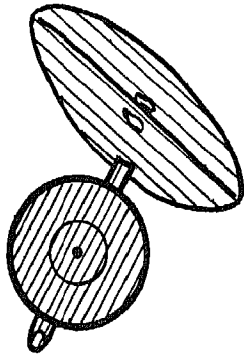
Introduction.—In order to continue the use of the coloured background and foreground in cutting out shapes and assisting in the rendering of objects in colour, a teapot and cosy are required for the following exercise. These objects are of simple shape and colour and will be well defined against a coloured background and foreground.

Exercise.—The teapot chosen is brown in colour, with an orange border surrounding its upper part With the teapot is a blue cosy, and both are placed on a white ground and are seen against a dark red background. The teacher will ask the children to turn their paper into the best position for drawing the group· in this way they will observe it as a whole, and realise it as a group. With their paper in position they should now lightly draw a line with their charcoal indicating where the line between the red and the white appears to come on that shape Time spent on the correct placing of this line is well occupied, for the whole lesson has relation to it The children should now observe the group with half-closed eyes to discover what shape is cut out of the red by the teapot, what shape is cut out by the cosy, and also what shape is left between them With light charcoal lines they can indicate these shapes. The effort to do this should not be hurried, for the proper representation depends upon the accuracy of this work Now the red background can be lightly filled in around the shapes· this should not be overloaded with colour, for the background is but an aid to shape rendering Below these shapes are new shapes cutting out parts of the white foreground Look for these and draw them in the same way, not forgetting the shape left between the objects. Our group is now in position This can be tested by thinking what a plan of our group would look like in this plan there will be no overlapping of the objects Colour can now be applied to the objects in first grade: to this we shall grade our colour according to the lighting of the objects. Directly opposite the source of light (the windows) we shall see spots of high light: these may be shown by a spot or touch of white pastel At this stage shadows should not be seriously considered, but if some children notice their shapes and

PLATE XLIV

THE USE OF A COLOURED BACKGROUND—PASTEL

1 Teapot and Cosy 2. Jug and Soap

wish to suggest them, a light application of charcoal to the colour on which they fall will be sufficient indication of their observation.

The jug and bars of soap shown on the Plate will make a further useful exercise in pastel drawing.

PLAN OF THE TEAPOT AND COSY

The writer has found in practice that it is a great incentive to effort on the part of children if the best drawings are fixed. Fixative solution with a sprayer can be procured from an art dealer, or the solution can be made by dissolving 1 oz of white shellac in ½ pint of refined methylated spirits The mixture should be colourless, and care must be taken that the shellac is thoroughly dissolved, and the solution kept well corked in a bottle. Arrange the drawings that are to be fixed in an upright position, place the long tube of the sprayer into the bottle containing the fixative, adjust the short mouthpiece almost at right angles to the bottle, and blow, keeping the sprayer about 18 in. from the drawing. The paper should be only slightly moistened by the process, and on no account splashed. The solution will dry quickly and the drawing will be fixed and preserved

X. IMAGINATIVE DRAWING—COLOUR

Exercise.—The children have already expressed in colour their imaginary pictures of garden borders and of the seashore: with this idea in mind, they can now make a picture of two children chasing butterflies in an orchard. A word-picture of the scene, told by the teacher, should stimulate mental activity and create an atmosphere of brightness and colour which will be conveyed to the minds of the children There are flowers making patterns in the grass and gaily coloured blossoms or fruit on the trees, the blue sky is flecked with white, against which the butterflies show their gorgeous hues Two happy children, dressed in their brightest clothes, are part of a pretty picture seen in the orchard

IMAGINATIVE DRAWING

The drawing can be done in pastel, but better results will be obtained from good body colour The children should be left to draw their own impression of the subject. the only aid suggested is the use of action figures to give position to the children in the picture (see page 70). A few pencil

lines can be drawn to plan the picture, but the colour, used as a flat wash, should be chosen and applied as fancy directs It will be found that while some children will reveal a lack of imagination, many will find this interesting form of putting down abstract pattern very attractive, and that pleasing results will follow

[*Reproduced by courtesy of the Royal Drawing Society*

"Snapshot Drawing" of "The Photographer," by M Little, age 15

XI. BRUSHWORK–COLOUR SCALES

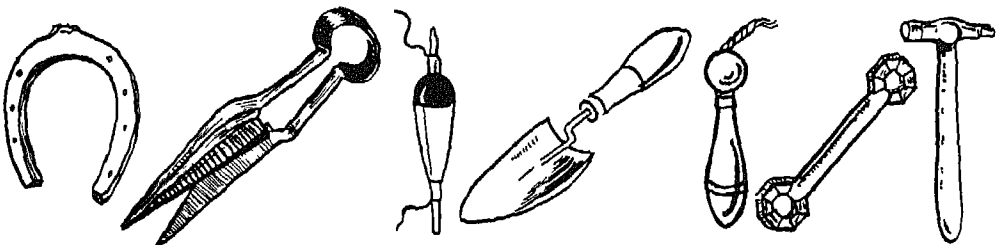
(Colour Plate No 165 D in the portfolio)

Exercise 1.—Collect good specimens of colour scales of red, blue and yellow (previously made during the course) and exhibit them to the class. Place them before the children with the key colours (marked K) on the same line It is proposed to compare the colour values of the scale Do the key colours possess the same value or weight of colour? It will be noticed that the value of the blue key is different from the value of the yellow. Red is also different, but not to so great a degree. The scales are now to

be arranged so that one of the reds shall have the same colour value as the blue. Must the blue scale be moved up or down? It will be moved up, because it will be a *tone* of red that will correspond in value to a blue The yellow scale must be moved up farther still in order to find a value corresponding to the red and the blue By choosing a colour on one of the scales, and by asking the children to decide on the corresponding value of the other scales, we have a valuable exercise in colour selection, and a training for the correct placing of tone values in brushwork By the use of coloured papers, choice can be made of similar or contrasted values, and specimens should be placed in the children's books to illustrate the fact, Fig. 1 on the Colour Plate

Exercise 2.—Coloured papers will be distributed for cutting out two should be of medium tone value and one of strong value The children will fasten to their papers one coloured paper of medium value as a ground for pattern work From the other papers they will cut a series of two shapes These cut-outs may be suggestive of any shape the children desire—vase, bowl, plate, half-moon, wedge, etc. The teacher will tell the children that these shapes of different colour values, together with the background, are to be used by them for making a pattern The children should experiment with their cut-outs, thinking not only of the grouping of the shapes, but of their effect upon the spaces between the groups. The teacher will allow perfect freedom of placing, and when the children are really satisfied that the pattern is what they wish to express, they can paste their groups down There will be some rather bizarre effects, but the practice of pattern work expressing the children's creative faculty and imagination contains useful possibilities, and should be perseveringly carried out. Many good results in pattern work will follow

Similar pattern work can be applied, either by cut-outs or direct brushwork, to cardboard models of baskets, boxes, trays and holders for pencils and matches (See Colour Plate)

XII. DRAWING FROM MEMORY—PENCIL OR COLOUR

Objects Suitable for Memory Drawing from Short Observation

Exercise 1.—*Short Observation* Show the children a large hammer and ask them to observe it carefully for about two minutes This is an exercise on observation and the teacher will make no comments on the points to be noted It is important that the children should make a thoughtful examination of the hammer exhibited, as the merely casual notice that the teacher is holding up a hammer will lead to vague impressions, and

the drawing will be unsatisfactory. The drawing should be made to a fairly large scale When the exercise is complete, the teacher will examine the results for general faults These faults will probably be the lack of proportion, the wrong position of the head with relation to the handle, and the want of perception as to the construction of the hammer By reference to the object and a few blackboard sketches these faults can be illustrated, while their correction will be dealt with in a future lesson

Other suitable objects for memory exercises from short observation are the following — a horseshoe, grass clippers, a trowel, a fishing float, a skipping rope with handles and a large spanner.

Exercise 2.—The teacher will read an extract of poetry or prose descriptive of some interesting object, bird, animal, etc The description should be as clearly expressed as possible, and the children should be asked to draw a representation of the thing described. In the history book will probably be found descriptions of tools and weapons—yokes, ploughs, shields, etc —any of which will serve the purpose of this lesson Such a mental effort will stimulate observation and draw the attention of the children to the craft underlying the construction of the objects noted

Such extracts as the following would be suitable to read to the class

> "Hickory, dickory, dock,
> The mouse ran up the clock.
> The clock struck one,
> The mouse ran down,
> Hickory, dickory, dock."
>
> *Nursery Rhyme*

> "There was an old man who said, Hush!
> I perceive a young bird in this bush!
> When they said, Is it small?
> He replied, Not at all!
> It is four times as big as the bush!"
>
> *Edward Lear*

> "Ring-ting! I wish I were a Primrose,
> A bright yellow Primrose blowing in the spring!
> The stooping boughs above me,
> The wandering bee to love me,
> The fern and moss to keep across
> And the Elm tree for our King."
>
> *William Allingham*

[Reproduced by courtesy of the Royal Drawing Society

LEOPARD

"Snapshot Drawing" by Phyllis Banister, age 16

"Hallo! A great deal of steam! The pudding was out of the copper A smell like washing-day! That was the cloth A smell like an eating-house and a pastrycook's next door to each other, with a laundress's next door to that! That was the pudding! In half a minute Mrs. Cratchit entered—flushed, but smiling proudly—with the pudding, like a speckled cannon-ball, so hard and firm, blazing in half of half-a-quartern of ignited brandy, and bedight with Christmas holly stuck into the top. Oh, a wonderful pudding!"

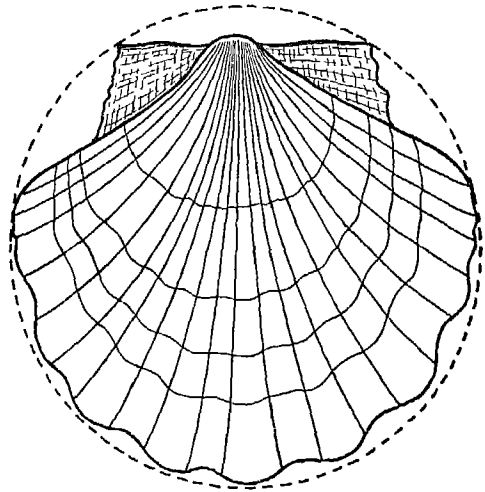
Charles Dickens.

"On the roof of a house situated at the extremity of a garden in a small town, a stork had built his nest. There sat the mother-stork, with her four young ones, who all stretched out their little black bills, which had not yet become red Not far off, upon the parapet, erect and proud, stood the father-stork; he had drawn one of his legs under him, being weary of standing on two. You might have fancied him carved in wood, he stood so motionless"

Hans Andersen.

XIII. THE DRAWING OF SHELLS—PENCIL

Introduction.—Shells of various kinds are suitable objects for drawing Many of the principles of construction which have been used in depicting plant forms are expressed in a new and interesting way when drawing shells It is instructive to examine a few shells, and observe the repetition of the principles of drawing already learned Specimens of the commoner shells are easily obtained from the seashore, from the fishmonger, or by loan from the local museum In rural districts where shells are not available the lesson on the chestnut leaf (page 171) may be substituted.

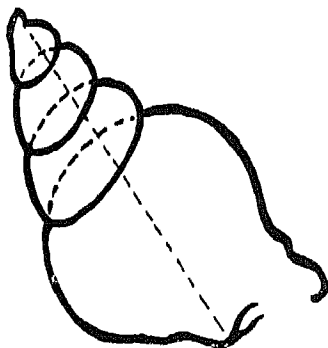
Exercise 1.—Place a few scallop shells in good positions before the class. Pass a string under the square hinge of a shell and suspend it against a white background on the blackboard, and with its convex surface facing the class By questions, get the children to notice that the general shape is a circle, that the top part of this circle contains a rectangle from the centre of which ray lines spread to the lower and middle portions of the circle; that the edge of the shell is formed of flowing curves which take position between the ray lines. These

PLAN FOR A SCALLOP SHELL

facts are the recognition of its general shape and of its radiation from a point

Having made these observations, the children are prepared to make their drawing. Draw the whole circle as the containing shape, in the top of this circle place the three sides of the rectangle. A point in the centre of the rectangle will give the starting

THE DRAWING OF SHELLS—PENCIL

1 Whelk Shells 2 Limpet. 3 Spiral 4 Nautilus 5. Mussel. 6 Turbinella

place of the ray lines Draw the outside pair to points about halfway down on the circle The next pair to be drawn are those on each side of an upright line through the centre From these lines other ray lines can be drawn from the ray centre equally on either side until the series is complete The edge of the shell is shown by a wavy line which curves outwards between the rays and inwards towards the rays. The main construction of the shell is now complete, but the children will notice that the shell edges are uneven, and they should be encouraged to suggest with light lines the realistic effect Some children will wish to add the series of lines which are seen on the shell in bands of colour.

HOW TO DRAW A WHELK SHELL

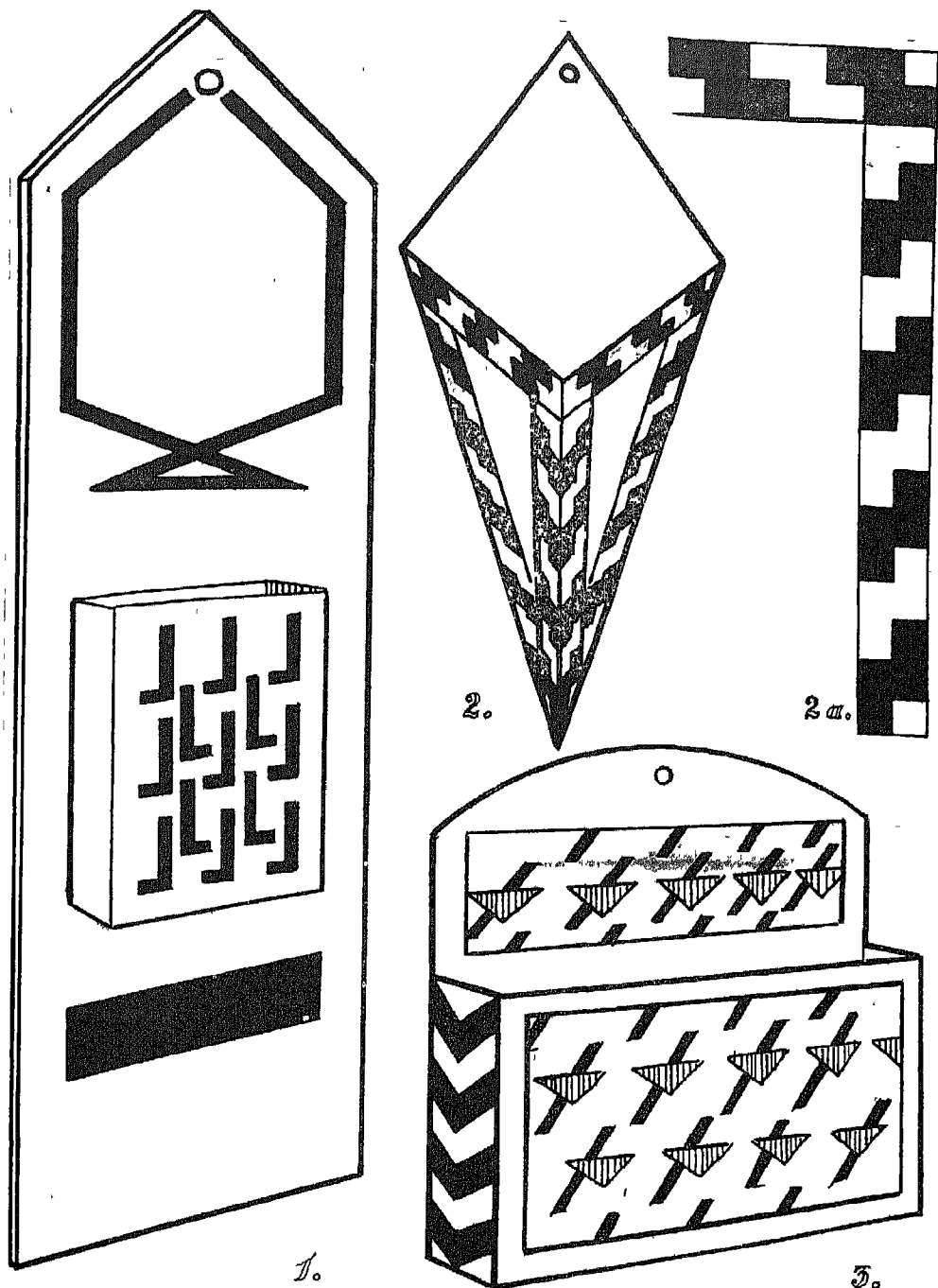
Exercise 2.—The whelk shell is a most interesting object for drawing and presents a form of construction different from that of the scallop shell The children will doubtless remember finding parts of whelk shells when searching among stones on the beach A part of a whelk shell is easily distinguished by its inner curves or whorls. From the observation of a broken shell it will be clear how its form is built up. The curves of its main lines coil themselves around the axis in a widening spiral, and remind us of the cone shape With this in mind, and the object before the class, it will not be difficult for the children to draw its shape. At least two views of the shell should be drawn The children should notice that one principle of construction underlies this and other beautiful shells of a similar type.

Other shells suitable for drawing are shown on the Plate.

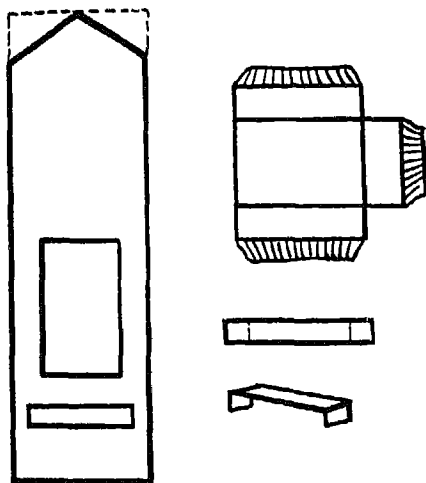
XIV. HANDWORK—DECORATED HOLDERS

Exercise 1.—The application of colour to models of useful and interesting objects is continued in this lesson. The model selected is a match-box holder, Fig 1. This should be made of cardboard of good weight and with an unglazed surface The cardboard should be 8 in. by 6 in and two drawings should be prepared as follows.

On the left-hand side draw a rectangle 7 in long and $2\frac{1}{2}$ in. broad, and divide it into halves by a line through its centre from top to bottom On this line, starting from the bottom, mark the following distances — 1 in from the base, next $\frac{3}{4}$ in, $\frac{1}{2}$ in and finally 2 in Draw level lines through each of these points making the two lines at the bottom $2\frac{1}{4}$ in long, and the top pair $1\frac{1}{2}$ in long These lines should lie evenly on each side of the axis Join their ends Complete this drawing by marking from the top $\frac{1}{2}$ in down the long sides of the figure join these to the top centre

The second drawing, which will be placed to the right of the first diagram, is the development of the match-box holder. Its main lines form a rectangle $3\frac{1}{4}$ in long

HANDWORK—DECORATED HOLDERS

1 Match-box Holder 2 and 2a Wall Pocket with Pattern 3 Letter Rack.

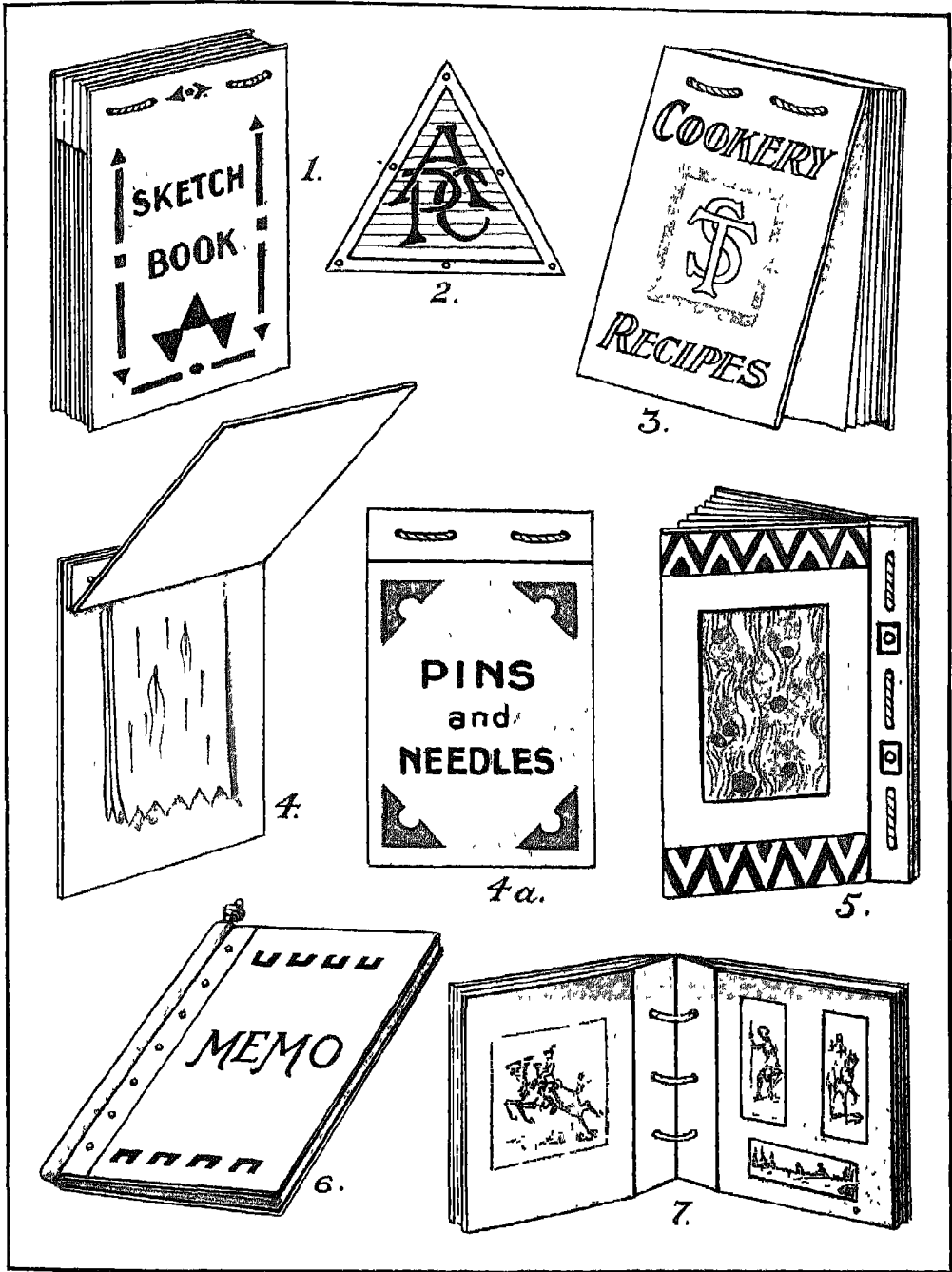
by 2 in. broad Place marks $\frac{3}{4}$ in. from the top and bottom on each of the long sides: join these points by lines to be extended $\frac{3}{4}$ in to the right, and also join their ends. Place flanges at the top and bottom of the figure and on the rectangle which has now been drawn at the side. Check all measurements before cutting out the diagrams. Prepare the holder for folding by slightly cutting or scoring all folding lines. fold very carefully by turning the development over and using a straight edge. Begin with the flanges and follow with the sides and bottom. Fit this shape to the pencil outline on the first diagram to see that the edges of the flaps exactly correspond. With Gloy or glue fasten the flaps carefully to the backing, seeing that everything sets square Now fasten a piece of striking surface from an old match box to the rectangle below the holder, and complete the model by punching a hole at the place marked near the top centre From the spare cardboard cut a strip $2\frac{1}{2}$ in. long and $\frac{3}{4}$ in wide: fold down $\frac{1}{2}$ in from each end, and insert this, with the ends downwards, to the inside bottom of the holder this will allow the match box to project above the holder, and the matches will be easily obtained.

PLAN OF MATCH-BOX HOLDER

Exercise 2.—To decorate this model, a tint of colour should be first washed over its surface: pale red would be suitable, and to this a bright red line could be placed round the edge of the backing, the striking surface, and the hole at the top. The front of the holder can be decorated by a pattern composed of simple brush strokes: this will be sufficient and effective for such a small surface.

Other objects which may be made to supplement the exercises given are shown in the Plate.

XV. HANDWORK—DECORATED COVERS

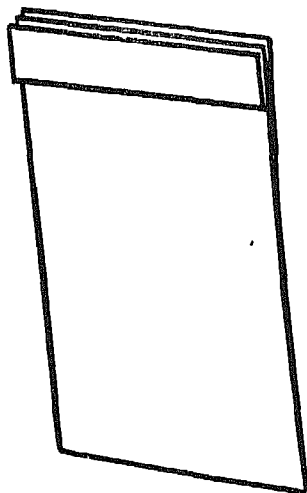
Preparation.—For the construction and decoration of a loose-leaf book, supply each child with strong tinted paper and a selection of coloured gummed papers. If these are not available, the teacher can adapt the means at hand and still provide a useful exercise in handwork Scissors, coloured cords (silk floss), a punching tool (or its equivalent) and a supply of loose leaves are required

Exercise 1.—The tinted paper will be cut to the size required for a sketch book, this should be about 6 in by 4 in Two shapes will be needed for the back and front. The loose leaves of drawing paper of the same size, 6 in by 4 in, should now be neatly cut, and from the waste a few short strips of paper equal in width to the book should be prepared These strips should be pasted to the top of each loose leaf for the purpose

Handwork—Decorated Covers

1 Loose-Leaf Book   2 Monogram   3 Decorated Book   4. Needle Book
4a Cover of Needle Book   5 Suggestion for Binding   6 Notebook   7 Picture Album

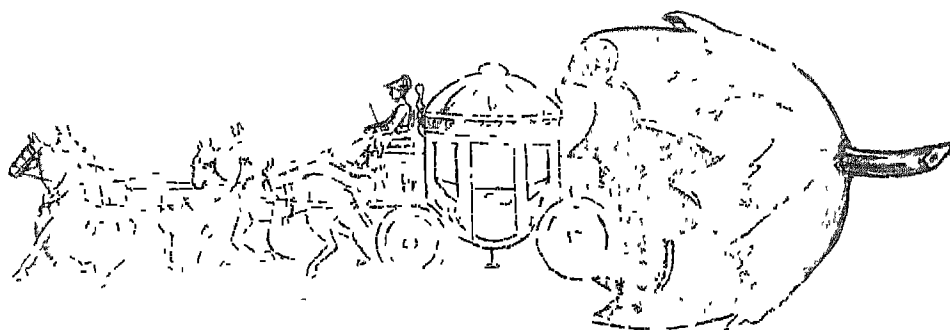
of adding strength to the binding. Now the loose leaves should be put together, and the covers placed in exact position ready for punching Holes for lacing should be carefully made with a proper punching and eyelet tool, or with a piercing tool The holes should be made with a sense of pattern, the children first marking the places which have been carefully measured The lacing cords are now inserted and fastened securely: these coloured cords should match the tint of the paper The completed book is now ready for decoration.

Art occupation.—The children should now be encouraged to decorate their sketch book This will be done with the coloured gummed paper from which they will prepare suitable cut-outs, which should be chosen to harmonise with the tint of the cover. The cut-outs should be made and adjusted to the cover before fastening down, so that a pleasing colour scheme and good spacing are ensured, Fig. 1 The middle should be left for a lettered description of the book or for a monogram of the owner, Fig 2. The book should be made definitely useful for outdoor sketches, nature studies, etc It can easily be dismantled, and refills of leaves can be added when required

A needle book with flannel as leaves would be a useful project for the use of girls in the needlework class, Fig 4 Other suggestions for models are shown on the Plate

A LOOSE LEAF WITH STRENGTHENING STRIPS ATTACHED

XVI. IMAGINATIVE DRAWING—PASTEL

HAVING been introduced to action figures (see page 70), the children can now add simple figures to their imaginative drawings The pictures can be drawn in pastel, for the colour will add interest to the scenes, and it will enable the children to suggest the elements of the pictures in the simplest manner. The story suggested for illustration in this exercise is taken from Hans Andersen's *Ib and Christine*, and the drawing should depict the incident of the wishing-nuts The teacher should introduce the lesson by a simple description of the children, with an outline of the story The following extract will be sufficient for the purpose

"Close beside them grew a nut-bush covered with the finest nuts, and they picked the nuts, and cracked them, and ate the delicious young kernels, which had only just become ripe But there was another surprise . . . in store for them Out of the thicket stepped a tall old woman, her face was quite brown, and her hair was black and glossy . . . she carried a bundle on her shoulder, and in her hand a knotted stick She was a gipsy. . . . She took three nuts out of her pocket, and told them that the

IMAGINATIVE SKETCH ILLUSTRATING AN INCIDENT IN A STORY

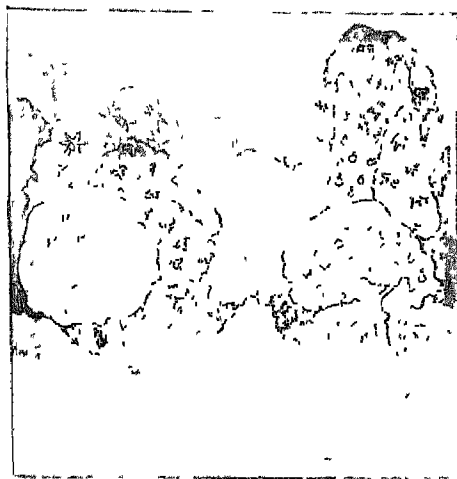
most beautiful things were hidden in them for they were wishing-nuts .

"Ib and Christine looked at the wishing-nuts with big round eyes

"'Is there a carriage and pair of horses in this nut?' said Ib

"'Yes, a golden carriage with two golden horses,' answered the woman"

The teacher needs only to mention the main elements of the picture—the gipsy woman, the two children and the thicket

As an aid to the composition of the picture a rough blackboard sketch should be drawn to indicate the principal masses, with the background of the thicket binding these together, but the remainder of the work should be the outcome of the children's imaginative effort

IMAGINATIVE SKETCH OF THE THICKET

XVII. PASTEL DRAWING—GRADING OF COLOUR

(Colour Plate No 166 D in the portfolio)

Introduction.—Our lessons in colour selection and tone values should have the effect of raising the children's standard of discrimination New perceptions have been received, and beauty of colour, hitherto unsuspected, is recognised The children will now feel the need for other means to express adequately the tints and tones which objects

present to them. It is this mark of progress which the teacher must meet by new methods While pastel, on account of a certain greyness in its composition, is not the best medium for drawing, it does provide an easy and convenient means of depicting colour. In previous lessons we have seen the general effect of light on various objects, and we have expressed this by the use of black and white It is now possible to show that richer and more truthful effects can be obtained by other methods.

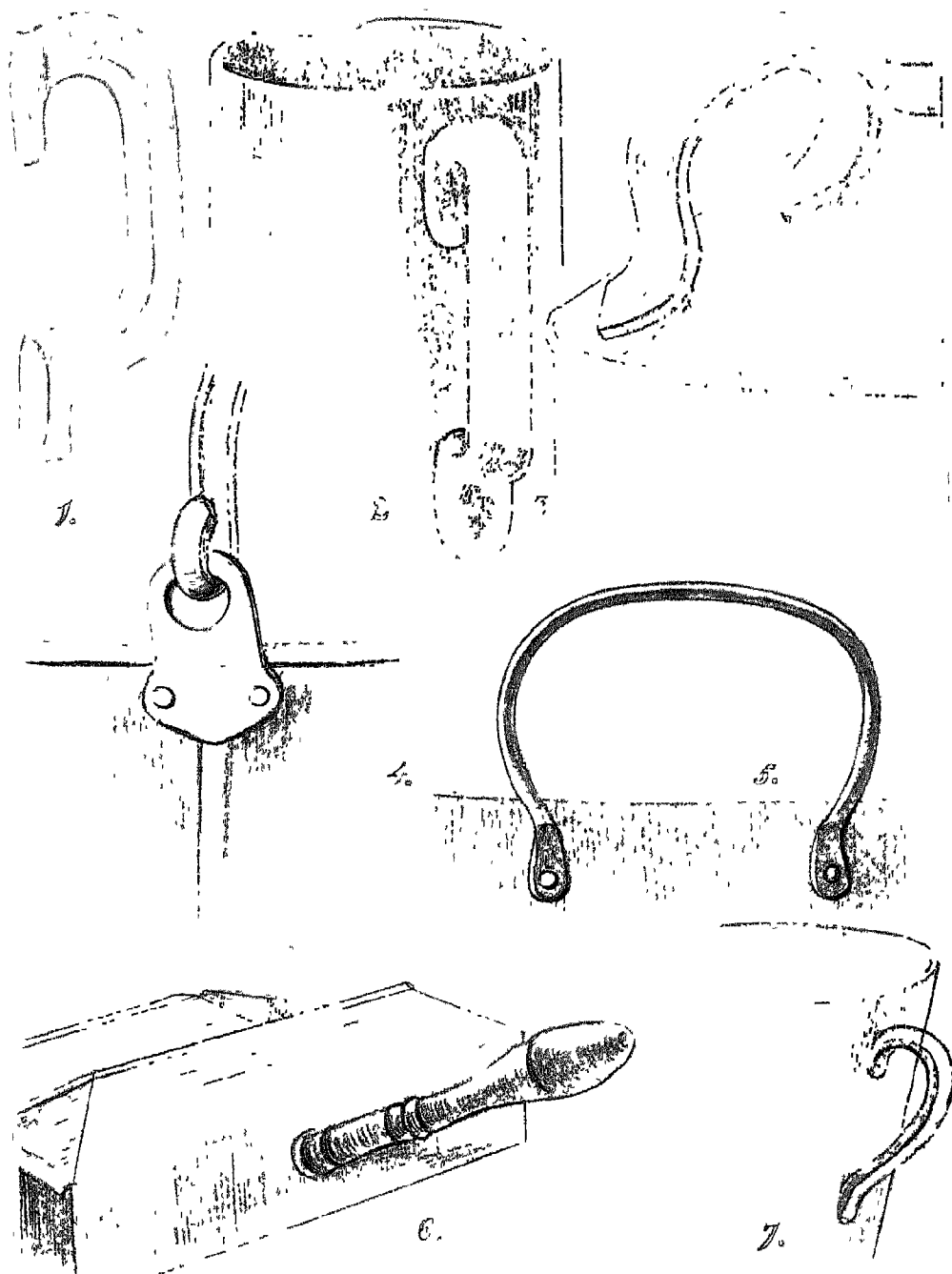
Exercise 1.—Let the children draw lightly with their charcoal a rectangle about 6 in. by 1½ in and cover it with a first grade covering of crimson lake Divide the rectangle into three parts: to the first division add yellow or orange, and to the last division add violet or brown Now place a new covering of crimson lake over the whole rectangle, working the colours together until it presents a band of red which shows in the three sections a beautiful light tint, a normal red, and a rich deep tone. It will be found that not three only, but many variations of the colour are presented The exercise is not merely mechanical; the children have to select and make experiments, and they find great delight in the general effect produced, and in the new range of colour presented by their efforts, Fig 1 on the Colour Plate.

Exercise 2.—A red bowl is a useful object for the purpose of expressing grading of colour Rounded objects lend themselves more effectively than faced objects to colour blending; for in the latter the difference in tone is sharply altered by the angles of the planes to the light The bowl should be placed in a good light, with a background of brown and a foreground of blue It can be drawn as in previous exercises from the shapes cut out of the coloured grounds A light covering of crimson lake is then applied The teacher will draw attention to the source of light, and the children, with half-closed eyes, will note its effect on the bowl Some of them will observe the beautiful effect of reflected blue from the foreground on to the underside of the bowl, and their attempts to suggest this should be encouraged This applies also to the placing of high lights and shadows. The subject of shadows will be dealt with in a later lesson, but the children should be allowed to try and express all that they see, Fig 2.

Other objects suitable for this lesson are canisters, vases, belts, ribbons, a stick of rhubarb, a hat, a red scarf, toys, vanity bags, a candlestick and a fan. (See Colour Plate.)

XVIII. THE DRAWING OF HANDLES—PENCIL

Introduction.—In many of the objects presented throughout this course the difficulty of drawing handles is frequently encountered At this stage we use modelling in clay to assist the children in their drawing The perception necessary for the correct drawing of handles is conveyed largely through the touch, hence modelling is a reasonable method of approach to drawing of this character

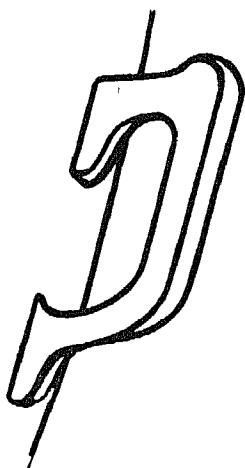
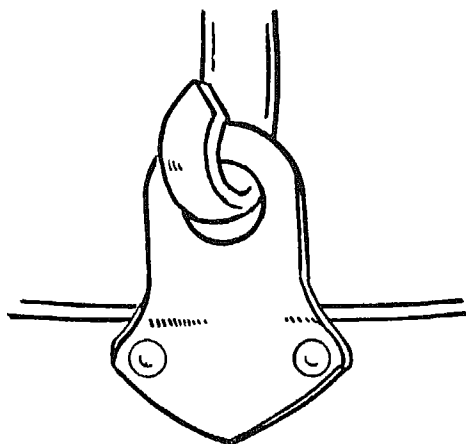
Exercise 1.—Provide each child with clay and the usual modelling tools. It is advisable to divide the class into four groups, and give each group one of the following objects to handle and observe—a jug, a handbag, a teapot and a cup A roll or strip of clay of the general thickness of the handle should be first modelled and bent to the shape of the particular handle The actual contour can be properly perceived

THE DRAWING OF HANDLES—PENCIL

1 Clay Handle 2 Handle of a Jug 3 Handle of a Jar 4 Handle of a Pail 5 Pan Grip 6 Handle of a Dustpan 7. Handle of a Cup

only by touch, and the clay should then be flattened or rounded as required The joints will be expressed by the addition of clay to the ends of the modelled handle. To secure the correct slope, the clay handle should be adjusted to the object and compared with the actual handle The teacher will ask the children where the lip or spout would be placed if the clay model were the real handle They should particularly observe that the spout is generally opposite the handle (In some coffee pots the spout is at right angles to the handle)

Further practice may be obtained by modelling the hook and joint of a pail or paint can, and the handles of an oil can or ink jar.

Of course, plasticine can be used instead of clay for modelling of the kind suggested. Those teachers who have not previously arranged for modelling in conjunction with drawing will find that the results are thoroughly worth while. Modelling demands keen observation and allows for comparison with the real thing, and in these ways is most helpful to correct drawing

Exercise 2.—The teacher will place a large teapot before the class and ask the children to draw the handle. It is to be shown joining the body of the teapot, so that a simple curve of one side of the teapot must be shown The drawing of this curve must be carefully done, as it indicates the contour of the pot. The children will notice that the line in which both joints are found follows the direction of this curve. The position of the joints should first be indicated as they are seen in relation to the contour line The inside curve can next be drawn, the children observing the shapes which it makes on each side of the line of the teapot The lines forming the outside of the handle are easily adjusted to this curve. Now, remembering the joints made on the clay model, indicate them by slight curves joining the inner curve and outside lines The rapid sketching of a few characteristic handles will accustom the children to the general appearance of the handles, and will greatly assist their further observation and drawing of such objects Similar methods will be applied to the drawing of the hook and joint of the pail handle. The clay model of these will be particularly instructive and useful for the purpose of drawing They should first be drawn to a large scale, so that their structure is thoroughly understood.

A Jug Handle

Hook and Joint of a Pail Handle

XIX. BRUSHWORK—COLOUR SCALE OF BROWN

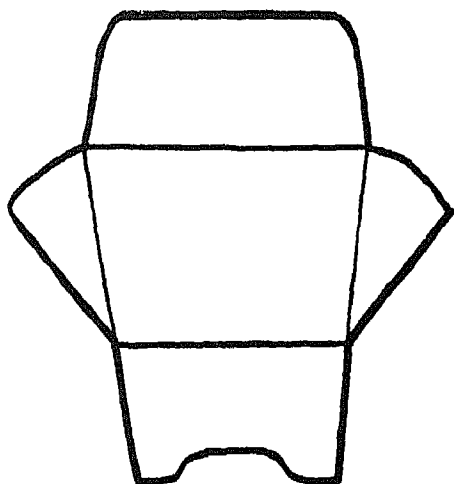
(Colour Plate No. 167 D in the portfolio.)

Preparation.—The teacher should be provided with a tube of burnt sienna, from which a dab of colour should be put on each child's palette. By the addition of white and black—which the children have used previously—it is proposed to construct a colour scale of browns

Exercise 1.—On the left centre of their books the children will draw the key square, K, with similar squares above and below it, lettering them A, B, C, above, and *a*, *b*, *c*, below. In these squares we shall show our tints and tones From the burnt sienna, with the brush fairly wet, the children can fill the key square with colour Above this they will place their tints, which they know how to secure by the addition of white· in the same way, by the use of black, they will place their tones (See Colour Plate.)

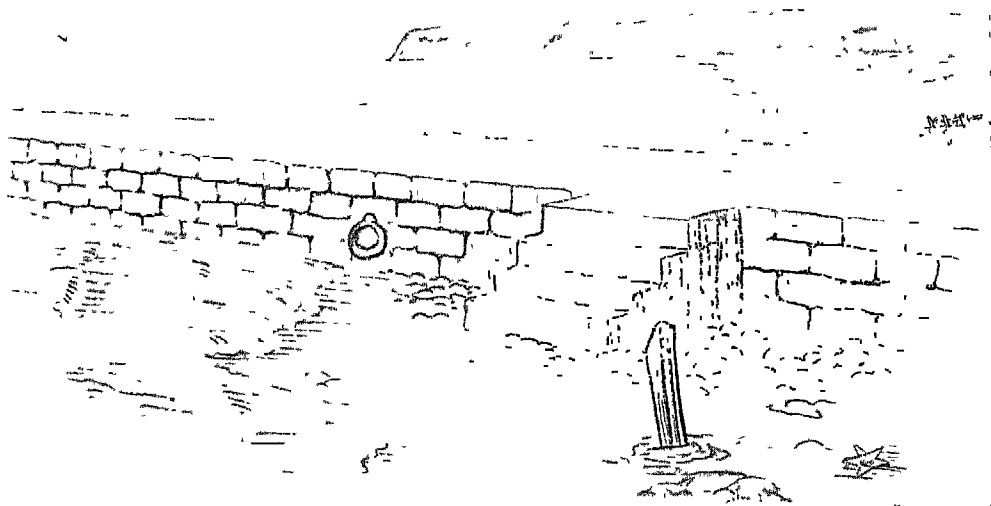
Exercise 2. *Oral*—The teacher should have a set of brown papers for the purpose of colour selection, and should first exhibit those which correspond to the scale. By show of hands the children can select the paper which is like the key colour, or like colour B of the tints, or colour *a* of the tones—and so on A few brown objects can be displayed—a penny, a brown book, a brown shoe, the desk, etc—and papers can be chosen to match these objects Finally, take an attaché case and find papers which match the tints and tones of the case as it lies on the table well lighted from a window Now match the papers with the scale, and the children will at once know what colours to prepare in order to paint the case; Fig. 6 on the Colour Plate.

Exercise 3.—By the aid of the distinct shapes made by the lighting of the case, the children will be able to produce rapidly a light pencil drawing of the shape. (This drawing should not be too large.) From their scale the children will decide which colours to use, and they will mix them as required. The top of the case is light and will need a tint Which is it to be? A, B or C? This tint can be applied in a flat wash. Proceed next with the middle and dark tones The general appearance of the case is now complete. The chief details of the handle and lock may be added by those children who feel able to represent them They can be indicated by the use of black and white, but as the drawing is on a fairly small scale such details can be only suggestive.

Art occupation.—As a further exercise the children can decorate an envelope, which

PLAN OF AN ENVELOPE FOR CUT-OUTS

should be retained and used for their collection of coloured cut-outs. This envelope will be more interesting to the children if they make it themselves. It should be of good shape, and can be constructed from the page of a drawing book on the lines suggested on page 51 The envelope can be tinted with a wash of colour, and a pattern can be added directly with the brush This pattern may be of an abstract nature and not purposely symmetrical Good lettering, well-placed, might indicate the purpose of the envelope, Fig 3 on the Colour Plate

Further studies in browns are shown on the Plate

XX. DRAWING FROM MEMORY—PENCIL

A MEMORY DRAWING

A dictation exercise.—As a further exercise in line direction and approximation of length, the teacher will slowly dictate the following instructions, and the children will draw as the dictation requires They should know nothing of the development of the drawing until the dictation is complete

(*a*) About one third from the bottom of your paper draw a level line 7 in long

(*b*) At the right end of this line draw an upright line 5 in long and mark off the inches.

(*c*) From each of these points draw level lines starting from the bottom, making the first one 7 in, the next 6 in, and so on to the top, which is 3 in

(*d*) From the end of each of these lines, starting from the top, draw an upright line to meet the level line below it.

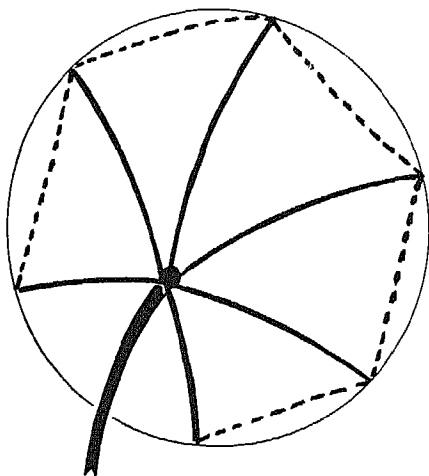
(*e*) From the right-hand corner at the bottom place a mark 5 in to the left, also 5 in on the level line above it, and then 4 in. on the next, 3 in on the next, and so on to the top

(*f*) From each of these new points draw an upright line to meet the line below

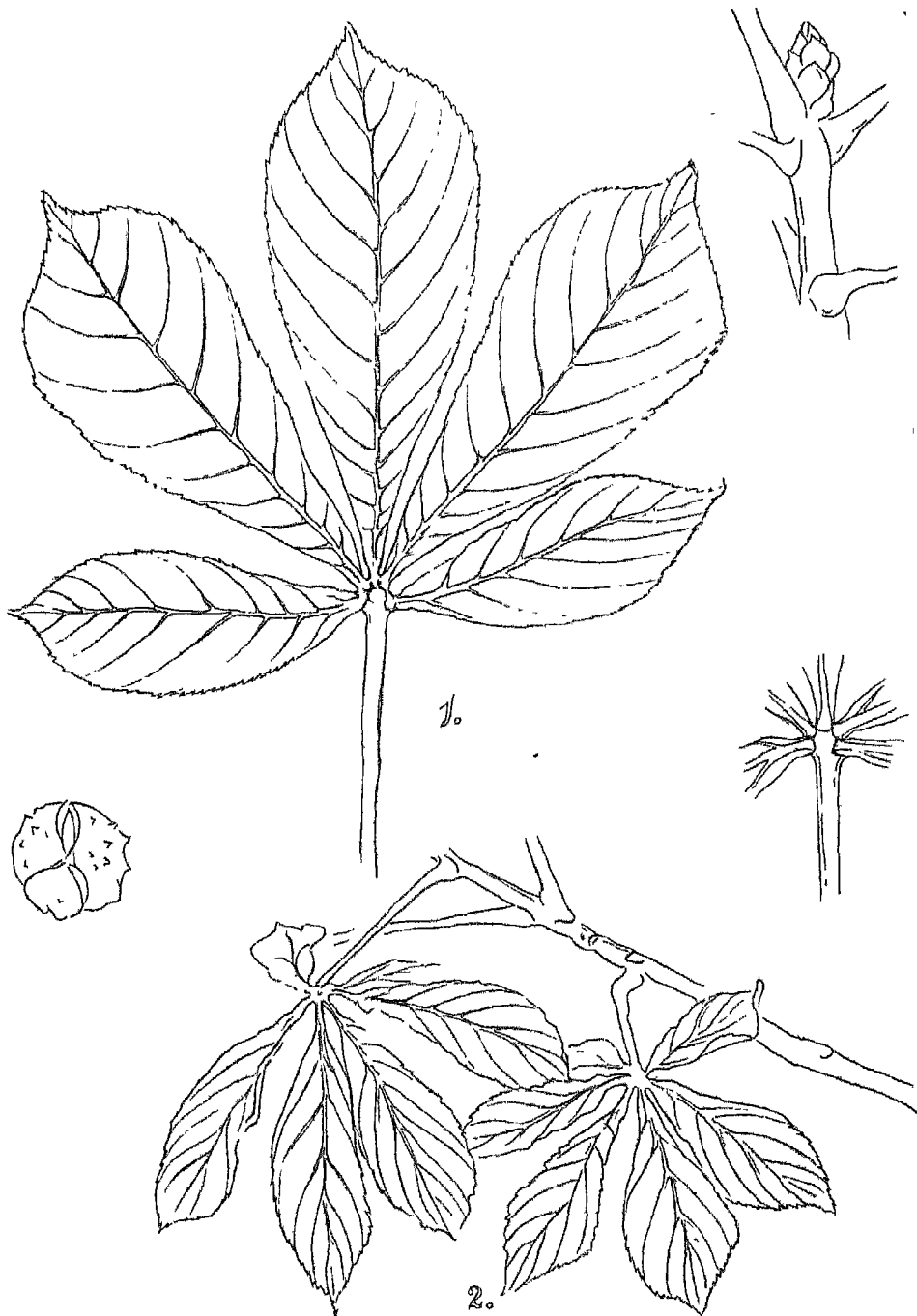
(*g*) If any of these lines seem to be more important than others, draw them more plainly.

(*h*) At the top of your drawing print clearly what this object appears to be, also print the place where you have seen something like it

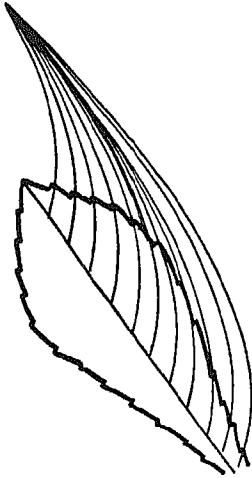
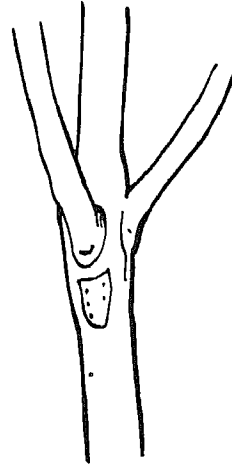
XXI. DRAWING FROM NATURE–PENCIL

Preparation.—The principle of radiation in leaf forms has appeared in several of our lessons on nature drawing, and the teacher should begin this lesson by asking the children the names of some of these forms Our purpose in this lesson is to draw the leaf of the horse chestnut Supply each child with a leaf The specimen leaves should not be too large and they should be of the same character. (The leaf of the chestnut may be composed of a group of five or seven leaflets from the same tree) It would be advisable to pin one large leaf against a white ground on the blackboard Viewed in this way the children will recognise the enclosing shape to be either a circle or a hexagon The use of both figures is of great assistance in planning the leaf

PLAN FOR THE DRAWING OF A HORSE CHESTNUT LEAF

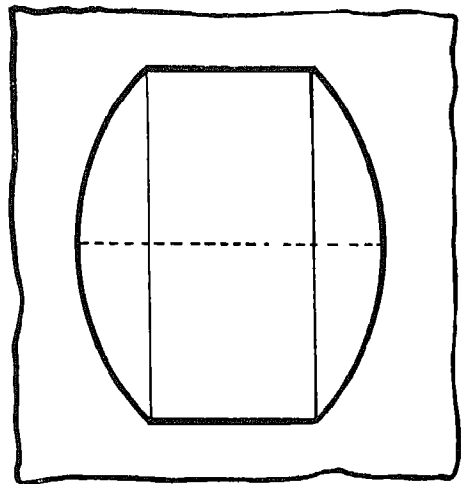
Exercise 1.—Let the children lightly draw a circle with a diameter about equal to that of the leaf. Now ask them to imagine such a circle round their leaf and, starting from the top, note where the points of the leaflets meet it Having put these points on their circle, they will join them with lines which will form a six-sided figure, towards the angles of which the leaflets are directed. The teacher will now ask where the starting point of the ray lines is found It is just below the centre of the circle From this point draw the ray lines which indicate the midrib of each leaflet of the group What are the chief points we notice about the form of a leaflet? Its widest part is near the top; it becomes gradually wider from the ray centre to its widest point, and it gradually tapers off to a rather long, spear-like point Draw the middle leaflet and continue with the others on each side of it, noting particularly the spaces between them. It is important to notice that these spaces have a shape almost as definite in form as that of the leaflets. The edge of a leaflet will be represented by a regular series of notches which take the same direction as the veins The veins curve upwards from the middle towards the leaf edge. It is interesting to notice that these veins form part of a system of ray lines which start from a point outside the leaf If we remember this fact, it will help us to secure the proper direction of the veins, see Sketch.

PLATE XLIX

DRAWING FROM NATURE—PENCIL

1 Leaf of Horse Chestnut. 2 Chestnut Spray

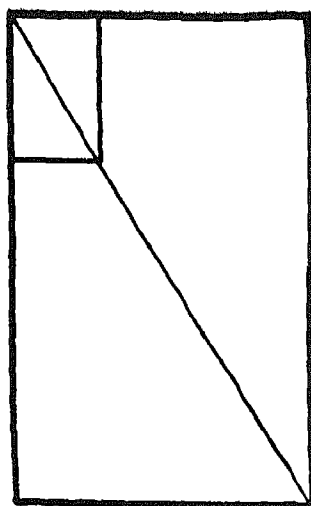
Exercise 2.—A simple spray of the leaves of the horse chestnut makes an attractive exercise, and children will be interested in drawing the stem with its joints, and observing the horseshoe marking on the surface where these joints occur. The leaf bud, when not too far advanced, makes another useful study of this plant form.

RAY LINES OF THE VEINS OF A HORSE CHESTNUT LEAF

STEM AND HORSESHOE MARK OF A CHESTNUT

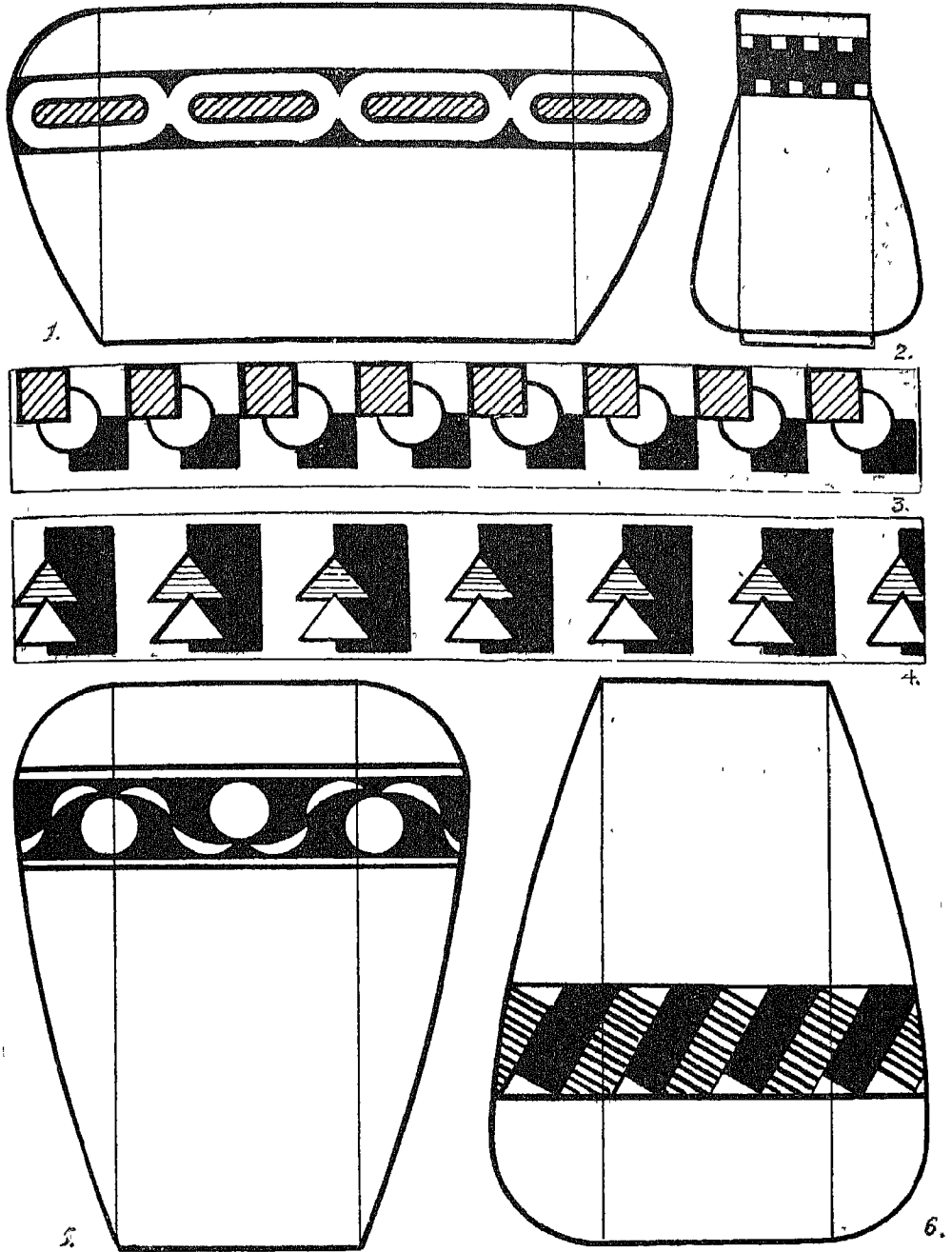
XXII. HANDWORK AND COLOUR—VASE SHAPES

Preparation.—Coloured gummed papers, rulers and scissors will be required for this lesson. The papers may be orange, green and purple, one being supplied to each child To avoid waste, our first exercise will be worked to a small scale Our purpose is to make paper shapes of vases and to discover why some shapes present good form—that is, why they please us, while others do not Our previous lesson on rectangular shapes should help us. When a well-shaped vase has been discovered, we shall decorate a larger copy of it with suitable cut-outs.

VASE SHAPE WITH GREATEST WIDTH IN THE MIDDLE

VASE SHAPE WITH GREATEST WIDTH ABOVE THE MIDDLE

Exercise 1.—Across the top of the coloured paper let the children draw a series of rectangles $1\frac{1}{2}$ in. in height, but of varying widths Remove the strip containing these rectangles and cut out each of the rectangles, placing them down in a row across the drawing book Cut off another strip also $1\frac{1}{2}$ in. wide, and cut that into rectangular shapes Take one of these shapes and draw a level line through its centre. Now fold it vertically with the pencil line outside and cut a curve from the bottom of the fold to the end of the line, and on to the top of the fold. Cut down the centre and place the curved cut-outs on each side of the first rectangle on your book; they fit exactly, and should now be gummed down with the rectangle Taking the next rectangle draw a level line away from the centre and near the top of the figure Cut as before from the bottom, round the end of the line, and on to the top. Fit these new cut-outs to the second rectangle on the book, and fasten the three shapes Repeat the process, placing the cross line for the cut-outs near the bottom of the rectangle and so invert the shape. Place this new vase shape on the book and fasten it down Continue to make similar experiments with the remaining rectangles so that there are a number from which to choose. Having done this, the children will carefully examine the row of

VASE SHAPE WITH GREATEST WIDTH BELOW THE MIDDLE

HOW TO ENLARGE THE SMALL RECTANGLE PROPORTIONALLY — THE SIDE OF THE VASE SHAPE

vase shapes made, and select the one they like best The teacher will make a note of the general opinion of the class on the choice of shape, and will find that the beauty of

HANDWORK AND COLOUR—VASE SHAPES

1. Paper Shape for a Bowl 2. Paper Shape for a Vase 3 and 4 Patterns made from Cut-outs. 5 and 6 Decorated Shapes of Vases

the vase depends upon the position of the line of greatest width.

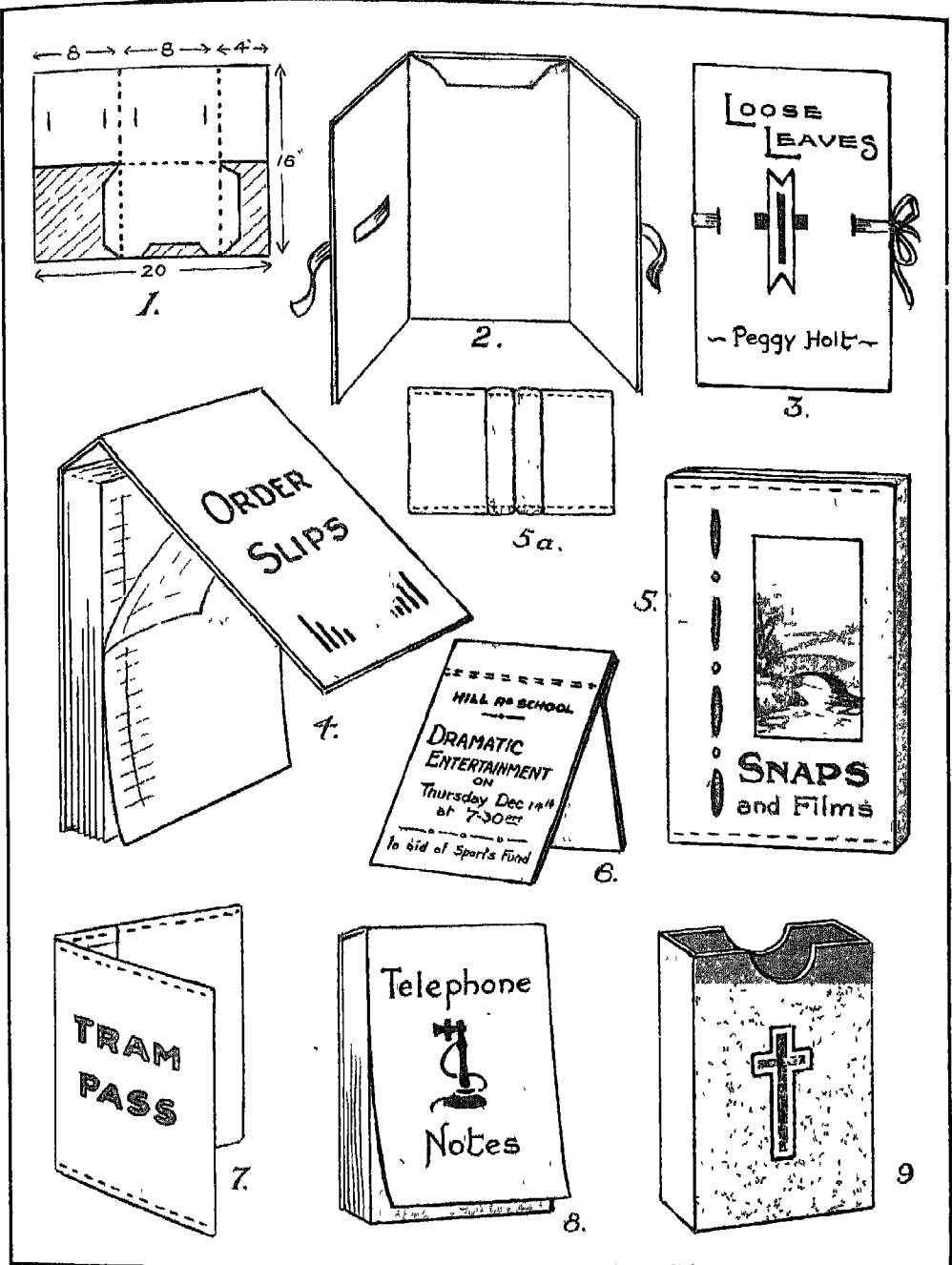
Exercise 2.—Let the children now take up the remaining coloured paper—which should be a fairly large piece—and at the top left-hand corner draw a shape exactly like the rectangle in the middle of their selected vase Draw a line from its top left corner to its bottom right corner and continue it across the paper Now measure 3 in. down the left-hand side of the paper and mark the length: from this mark draw a level line to meet the sloping line from the point where they meet, draw an upright line to the top of the paper. Cut this shape out and notice that it is a true copy of the small rectangle and can be used to make a larger vase (See page 91) Now cut out another rectangle for the curved sides, draw the line for its widest part, as before, fold and cut Fit these to the large rectangle and fasten all three shapes down From the waste a shape can be cut to give the vase a suitable rim.

In a further exercise the children can decorate their vase by a scheme of colour harmony built up from coloured paper supplied to them, or they can apply a pattern from their collection of cut-outs, see Plate

XXIII. HANDWORK–FOLDERS AND COVERS

Exercise 1.—Prepare a folder for holding loose leaves, and show it to the class for them to investigate its construction. The children will observe the all-over shape and the size of the paper required, the position of the folds, the form of the pocket, the length of tape and the position of the slits for its insertion. The paper will require to be 20 in. by 16 in, Fig 1. The method of construction is shown by a folding line halfway between the top and bottom The width is divided by two folds, one being 8 in from the left-hand side, the other 4 in from the right. From the teacher's model it will be seen that the bottom left square and the oblong at the bottom right are to be cut away, leaving flaps Cut out a shape for the mouth of the pocket, and make slits for the tape 2 in. within the upright lines of the two top squares and halfway across them. The model is now ready for folding and fastening Bend the flaps inwards, fold the bottom square upwards and fasten the flaps. Now fold the oblong inwards, crease neatly, and then fold the left square in the same manner. Insert the tape and ornament the cover with a simple pattern, Figs. 1, 2 and 3

Exercise 2.—To construct a household tear-off note block, two pieces of cardboard about 5 in by 4 in in size are needed. These should be covered by placing the cardboard on sheets of tinted paper leaving about ½ in on each side for folding purposes these edges should be neatly folded and mitred, and the inside of the covers lined with white paper The tear-off block should now be prepared Place the writing sheets carefully and paste or gum a piece of book muslin along the top, leaving 1 in. or so of muslin to be fastened securely to the bottom cover. This should be pressed and allowed to dry thoroughly. The covers must now be backed with Duxeen or linen so folded that sufficient play is left for the thickness of the block of papers. The linen must be neatly gummed so that it appears evenly across the front and back covers. The front cover can be decorated and given a suitable title illustrating the use of the block, Fig. 4.

Exercise 3.—Show the children a typical folder for holding photographic snaps and films. From their investigation they will now be able without further direction to

HANDWORK—FOLDERS AND COVERS

1. Plan for Folder 2 Folder 3 Decorated Cover of Folder 4 Tear-off Block 5 and 5a Case for Snaps and Films 6 Concert Notice 7 Ticket Holder 8 Block Notebook 9 Book Holder

construct one for their own use. This exercise provides a new feature in binding as the pockets are formed by folding and stitching Rule a line across the top and bottom of the folded model about $\frac{3}{16}$ in from the edges, to indicate the position of the stitching Holes should be pricked at even distances on these lines, and the sewing carried out with silk thread The cover can be made attractive by pasting a photograph in a good position on the outside, and by adding a border and a title, Figs. 5 and 5a.

Similar practice can be found in the construction of a holder for a tram pass or season ticket; a telephone book, and a case for a hymn or prayer book, Figs 7, 8 and 9.

XXIV. IMAGINATIVE DRAWING—COLOUR

[*Reproduced by courtesy of the Royal Drawing Society*

"Snapshot Drawing" by D Olliver, age 14, St Helen's School, Abingdon

"Of course it's just a place I imagine"—*Dream Days*, by Kenneth Grahame.

It is suggested that the teacher procures a copy of *Dream Days* and reads part of the chapter entitled *Mutabile Semper* The following excerpt will be sufficient to stimulate keen interest The imagination of the children will do the rest. The excerpt is reprinted by permission of the publishers, Messrs. John Lane The Bodley Head Ltd.

"This bit of road here—up as far as that corner—you know it's a horrid dull bit of road. I'm always having to go up and down it, and I know it so well, and I'm so sick of it So whenever I get to that corner, I just—well, I go right off to another place!"

"What sort of a place?" she asked, looking round her gravely

"Of course it's just a place I imagine—but it's an awfully nice place—the nicest place you ever saw And I always go off there in church or during joggraphy lessons."

"I'm sure it's not nicer than my home," she cried patriotically "Oh, you ought to see my home—it's lovely! We've got. "

"Yes it is, ever so much nicer," I interrupted. "I mean"—I went on apologetically —"of course I know your home's beautiful and all that But this must be nicer, 'cos if you want anything at all, you've only got to want it, and you can have it!"

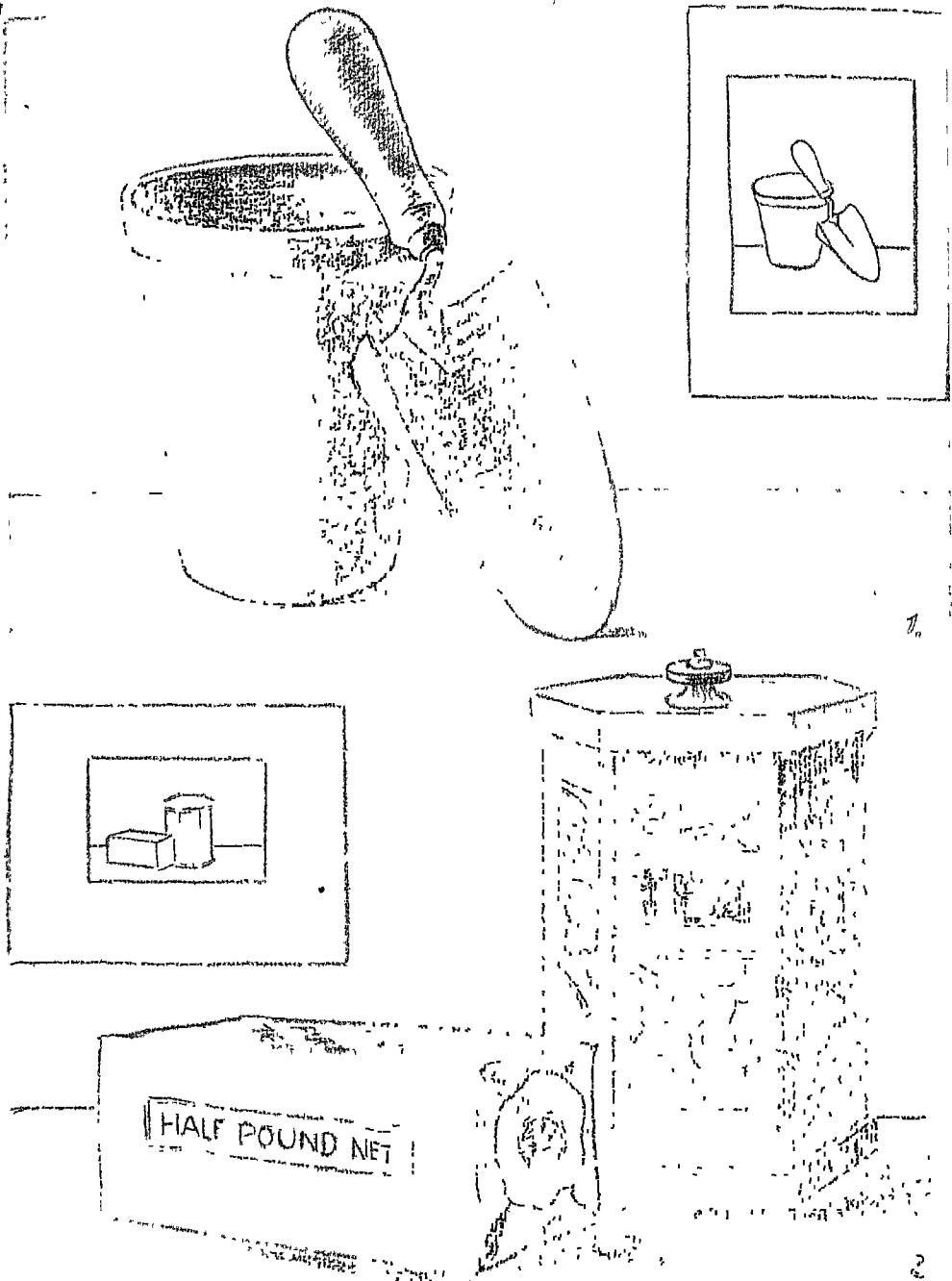
"That sounds jolly," she murmured. "Tell me more about it, please"

Let the children tell in drawing something about this dream place which lives in the minds of most children and even of adults The picture can be suggested by a simple outline drawing which is afterwards coloured with a flat wash according to the children's fancy The teacher should encourage decoration as the keynote of the picture—a stream, meadows, flowers, boats, etc Both teacher and children should catch the spirit of the writer, and enter upon the exercise as one of pure imaginative work, roving for a while amid fanciful scenes and fanciful objects.

[Reproduced by courtesy of the Royal Drawing Society

"Snapshot Drawing" by D Olliver, age 14, St Helen's School, Abingdon

XXV. PASTEL DRAWING—THE USE OF THE VIEW FINDER

Preparation.—Set up a flowerpot and a garden trowel against a blue background and a brown foreground. The flowerpot should be in an upright position with the trowel leaning against it Each child should make a paper "finder" (see page 112) and by holding it between the eye and the object each one will be able to adjust the "finder" so that the group is seen nicely placed to make a picture The best picture may be upright or lengthwise, the "finder" will indicate which shape to select. The children should also decide by this means how much background and foreground should be shown to make the picture interesting When satisfied, they should note the position of the "finder," as they may need to use it frequently This observation must be

PASTEL DRAWING—THE USE OF THE VIEW FINDER

1 Flowerpot and Trowel 2 Tea Caddy with Packet of Tea

thoughtfully carried out, for their drawing should represent the view selected The "finder" is of much value in placing the group on paper, and it greatly assists the appreciation of colour shapes and values

Exercise.—Let the children place their paper in the position which they think is best for the group, and draw a line in charcoal indicating the limit of the ground Above this is the general shape cut out of the blue background by the flowerpot. This can be indicated by the leading lines—the sloping lines of the inverted cone and the curve of the top Similarly, the trowel cuts out a shape which can be indicated with charcoal The "finder" should now be used to test the correctness of the blue shapes cut out of the background. When these are correct, light blue pastel can be used to fill in the background. By similar methods show the shapes cut out of the brown foreground We have now two silhouettes of our objects to which we can apply the colour

Our colours in this group are not self-colours, they have to be prepared The colour of the flowerpot will provide an exercise in colour selection Ask the children to select a colour which nearly matches the flowerpot: some will select orange and some bright red This gives an opportunity for the teacher to remind them of certain colours in which another colour predominates. Thus in green, it may be yellow or blue which predominates, in red, it may be yellow or violet The flowerpot is an orange colour in which bright red shows clearly, so it can be coloured with orange, and blended with light red The trowel must be coloured as it appears, if new, its colours will be definite—a yellowish orange for the handle and a bluish slate colour (violet and green) for the scoop. If it is much used, these colours will be modified. The final effects can be attempted by the more ambitious children, who will observe the delicate play of green and blue on the flowerpot, in addition to its tints and tones

It will be seen that this exercise deals with more subtle colours than those hitherto taken this is purposely done in order to exercise the children's colour perceptions and their power of expressing them

Other groups of models serving a similar purpose might be chosen from the following: a mustard tin and a Bovril bottle, a paint can and brush, a tea caddy and a packet of tea; a bowl and a cake of carbolic soap; a parcel with a label and a loaf and butter. The teacher should always present the objects with suitable backgrounds

XXVI. THE CONE AND CYLINDER—PENCIL

Oral Work.—In this lesson it is proposed to revise what we learned about cone-shaped and cylinder-shaped objects by means of colour shapes, and to add to our knowledge by drawing these shapes in new positions

The teacher should be provided with a large coloured disc with a stick set perpendicularly to its base A Japanese sunshade would also be suitable for the purpose. Place the disc flat upon the table in front of the class with the stick in an upright position. The teacher should ask a few questions about the disc—its appearance as an ellipse and the position of the stick with regard to the disc The children will see that a level line is met by an upright line. This makes an angle Have you seen any angles like this? There are scores of them in the room—in the window frame, on the doors and cupboards, the table legs, the teacher standing on the floor, etc This

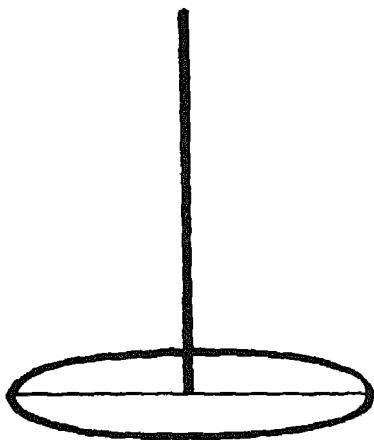
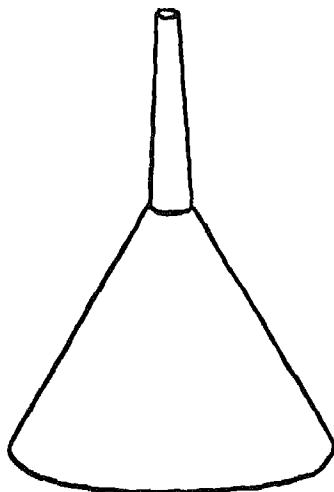
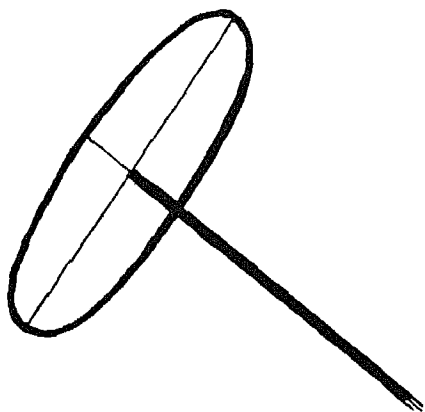
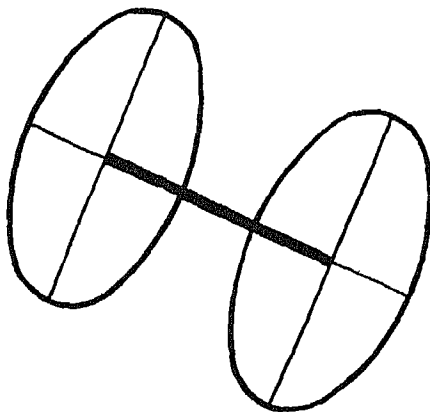
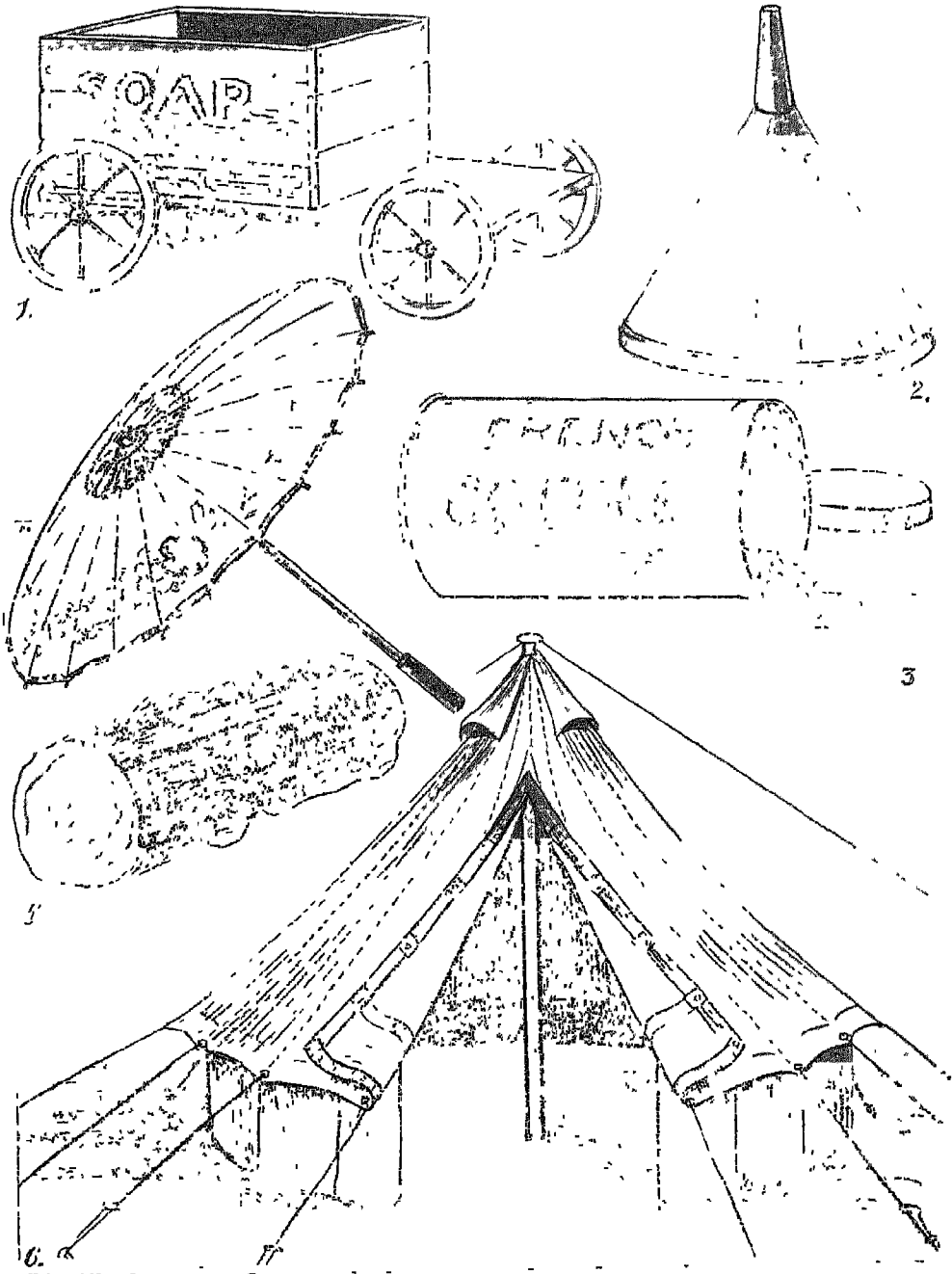
angle is a right angle. The children can pick up a book and find the right angles. Turn the book slightly to the right or left and observe that the angles are still right angles. The teacher will now lift one side of the disc and ask the children to watch the right angle. Let them trace its shape in space in varying positions What do they find? (Always the right angle) Fasten another disc at the other end of the stick and repeat the motion After a few similar experiments the children will observe that the stick is always at right angles—and appears so—to the discs. The teacher will now refer to the cone and ask where the stick might be found in the cone. Where also would the stick be placed between two wheels of a toy cart? From this it will be an easy step for the children to name objects where a line through the centre seems to keep everything

Coloured Disc and Stick at Right Angles

A Funnel

Demonstrating the Right Angle with a Coloured Disc and a Stick

Two Paper Discs joined by a Stick

PLATE LIII

THE CONE AND CYLINDER—PENCIL

1 Child's Gocart 2 Funnel 3 Coffee Tin 4. Japanese Sunshade 5 Log

6 Tent

in place. Such objects will be an umbrella, a funnel, the school bell, a lifebuoy, a limpet shell, a cocoa tin, a boiler, a drum, a jug, a tumbler, a tent, a garden roller, etc

Exercise 1.—Place a hand bell or funnel in an upright position and let the children draw it They will probably draw it by planning its general shape. They should now be asked to imagine that it is made of glass, and they are to draw the whole of the ellipses which would be seen Find the centre of the bottom ellipse and draw an upright line to the top. What do they notice? These are the lines of construction which have been added to their knowledge of the general shape. The teacher will now place the funnel lying on the table, and ask the children to draw it in its new position. They should not be instructed how to draw it, but from their knowledge of its general shape, and the assistance given to their perceptions by the oral introduction, they should make a fair attempt at its representation.

Exercise 2.—A further exercise could be given by using a coffee tin lying on its side. An element of interest will be introduced if some of the contents are pouring out of the end on to clean paper. In this exercise the children will recall simple experiments with the two discs and the stick This should enable them to draw the coffee tin correctly. Other suitable objects are a hanging jug, a straw hat, a saucepan on a nail, a thimble on a desk, the wheels of a gocart, a log of wood, a hot water bottle, a carrot, a parsnip and an onion.

XXVII. BRUSHWORK—COLOUR SCALES

(Colour Plate 167 C in the portfolio)

Oral.—In Lesson XI of this year's course the colour scales of red, blue and yellow were used to learn something about tone values. It is now proposed to use the orange, violet and green scales for the same purpose The teacher will collect three good copies from the books—or prepare scales—and show them to the class. They will be arranged with the key colours—marked K—on the same level Beginning with orange, the teacher will raise or lower the violet until the class has reached agreement upon colour value. Adjust the green in the same way until a tint or tone corresponds with K of orange and the selected colour of violet Now note the position of K in each scale: this will illustrate whether the colour as a whole has a strong tonal value, or otherwise The children can select the strong or weak tones and, by further experiments, find colours of equal tone beginning with any given tint or tone of orange.

Exercise 1.—Show coloured papers and ask the children to select one colour of strong value and two of medium or weak value. From the selection, the teacher will distribute small samples of such coloured papers to the children for the purpose of pattern making. The children should now be provided with scissors and told to make some interesting cut-outs from the papers chosen for the pattern It would be well for the children to decide whether the background should be of strong colour value and the cut-outs of lesser strength, or vice versa. They have now had sufficient practice in the use of cut-outs to be able to devise their own by paper folding and cutting. The teacher will encourage them

to make groups of cut-outs and before gumming them down place them on the background in some orderly arrangement. They will now understand that the background is to be used in the pattern equally with the cut-outs. When this has been done, the cut-outs should be neatly fixed In this way each child will exercise his own creative faculty, and express his individual sense of pattern making This work becomes absorbingly interesting, and the variety and novelty of the patterns will be really remarkable. A few good specimens should be selected and exhibited by the teacher It will be seen that in order to make their patterns, children unconsciously develop a definite orderly arrangement, which upon analysis supplies a plan. The teacher will find that by permitting the children to experiment with these colour shapes, they will arrive at a working principle, which is infinitely better than giving a principle upon which all are directed to work, Figs. 1 and 4 on the Colour Plate.

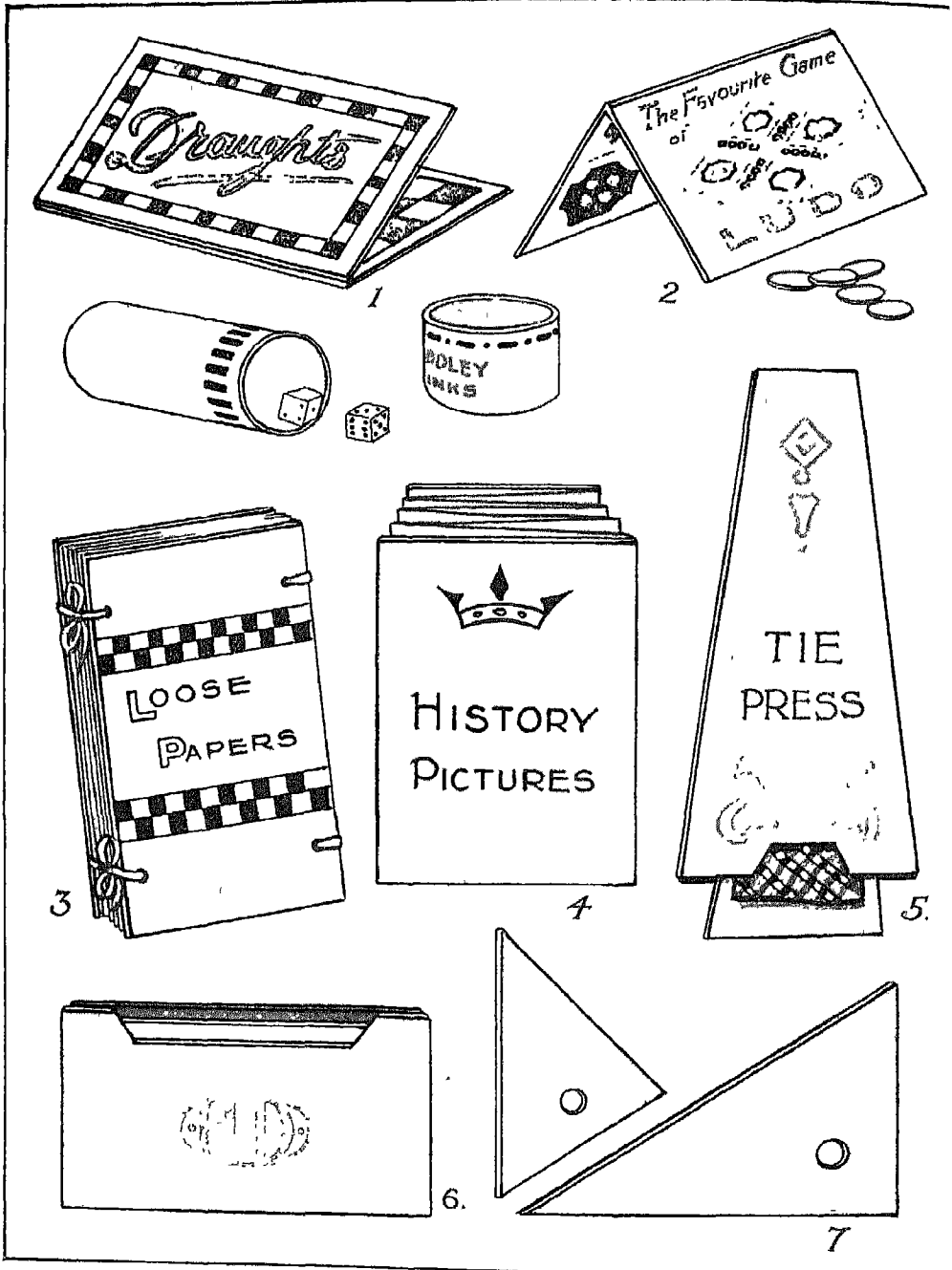
Art occupation.—Distribute papers to the children and ask them to cover the surface with a wash of pale violet or orange. On this tinted paper they are to print four lines of poetry, and to place a top and bottom border to correspond to the rhythm of the lines While the children are preparing their plan, the teacher will write the stanza:

> "Where the pools are bright and deep,
> Where the grey trout lies asleep,
> Up the river and o'er the lea,
> That's the way for Billy and me."

The pattern should be of a simple spot and line character, the teacher first helping the children to note the rhythm of the lines—the strong and weak accents. Good script type should be used for the printing and it may be done in colour. The general colour harmony should be left to the children's discretion. (See Fig. 2 on the Colour Plate)

XXVIII. HANDWORK—BINDING COVERS

Exercise 1.—Children will take a keen interest in constructing a board suitable for games such as draughts, halma and races. Two strawboards each 6½ in by 13 in. will be required, together with strips of binding linen about 1 in. wide and 2 ft long By examination of a specimen board the children will readily discover the method of construction The strawboards are placed near together, separated by about ⅛ in : this space is sufficient to allow for the play of the covers when opening and closing them The binding strip should be carefully gummed and the boards placed in position with the strip evenly joining them A strip should now be fastened similarly on the inside, thus binding the boards both back and front. The strips should be allowed to dry thoroughly while a covering surface is being prepared The size of this surface will be 14 in. square, and it may be of a good wallpaper or paper nicely tinted; it should be fairly thin but strong Duxeen or linen would be the best material for the cover but it is expensive for class use. Previous exercises on binding will have prepared the children in fastening and folding this covering surface.

Now all is ready for the application of the game chart, and its form will depend on the game chosen. For draughts, the chart will be a square foot of paper divided into sixty-four squares, therefore, mark off distances of 1½ in along each side and join them across. The squares should now be washed in with two colours used

HANDWORK—BINDING COVERS

1 and 2 Games Boards
5 Tie Press
3 Holder for Loose Papers
6 Card Holder
4 Picture Folder
7 Cardboard Set Squares

alternately—say yellow and black Lines of red ink drawn to separate the squares will complete the chart effectively The chart should now be pasted carefully on to the boards, so that the inside edges of the surface are evenly covered. For the purpose of race games, the children can construct a dice box by using a piece of thin cardboard $3\frac{1}{8}$ in long and 2 in wide for the cylinder, and a circle of 1 in. diameter for the base They will need no instruction for making this box, as similar models have been made in previous lessons

Exercise 2.—Another exercise in the use of strawboards is supplied by the construction of a holder for papers The size can be adjusted to that of the papers to be preserved The covering surface will be cut to allow an extra $\frac{3}{4}$ in all round for folding over the edges This having been cut and fastened on each of the boards, a clean sheet of paper will be gummed over the inside to cover the folded edges and give a neat appearance to the boards Instead of binding, as in the previous exercise, holes will be punched, and tape or ribbon of a suitable colour inserted for tying purposes Simple pattern work will make the model attractive, Fig. 3

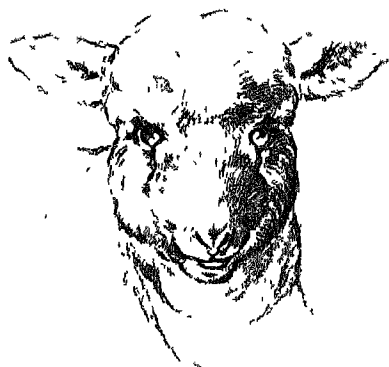
With strawboards the children can apply their knowledge of paper folding, and make handy booklets for preserving pictures and sketches. The paper can be provided in a long strip It is folded concertina fashion and the ends are pasted to the strawboard covers. The children can decide what use they will make of their books and inscribe them accordingly, Fig 4.

With strawboard the children can make a useful tie press and a card holder, they can also make a pair of set squares to be used in drawing the plans of some of their models, Figs. 5, 6 and 7

XXIX. DRAWING FROM MEMORY—PENCIL OR COLOUR

Exercise 1.—The first exercise suggested for this lesson is a further example of short observation for about two minutes The teacher will show a jam jar with a label The jar should be of simple cylindrical shape, and should be held so that the class can obtain a view of the top ellipse When it has been observed by the children, it should be placed out of sight and the drawing should then be made The teacher will note the methods used by the class, and observe whether the children conform generally to the teaching that has been given. The drawing of the label should not be overlooked, as it forms a good test of perception. A selection of copies should be exhibited together before the class. The chief mistakes may be faulty proportion, pointed ellipses and a straight-edged label on a rounded surface These faults should be corrected in later lessons

Exercise 2.—This is an interesting exercise for memory drawing associated with the sense of smell. Ask the class to close their eyes for a few moments during which a piece of cobbler's wax (heelball) is held over a burning match. In a short time the scent will be conveyed to the class and will suggest many things. The children will make a drawing of what the smell reminds them of The associations which cluster around such a simple act will quicken perception, and a variety of drawings will be made to express them Other examples for an exercise of this kind are a cut onion, burnt wood, tobacco fumes,

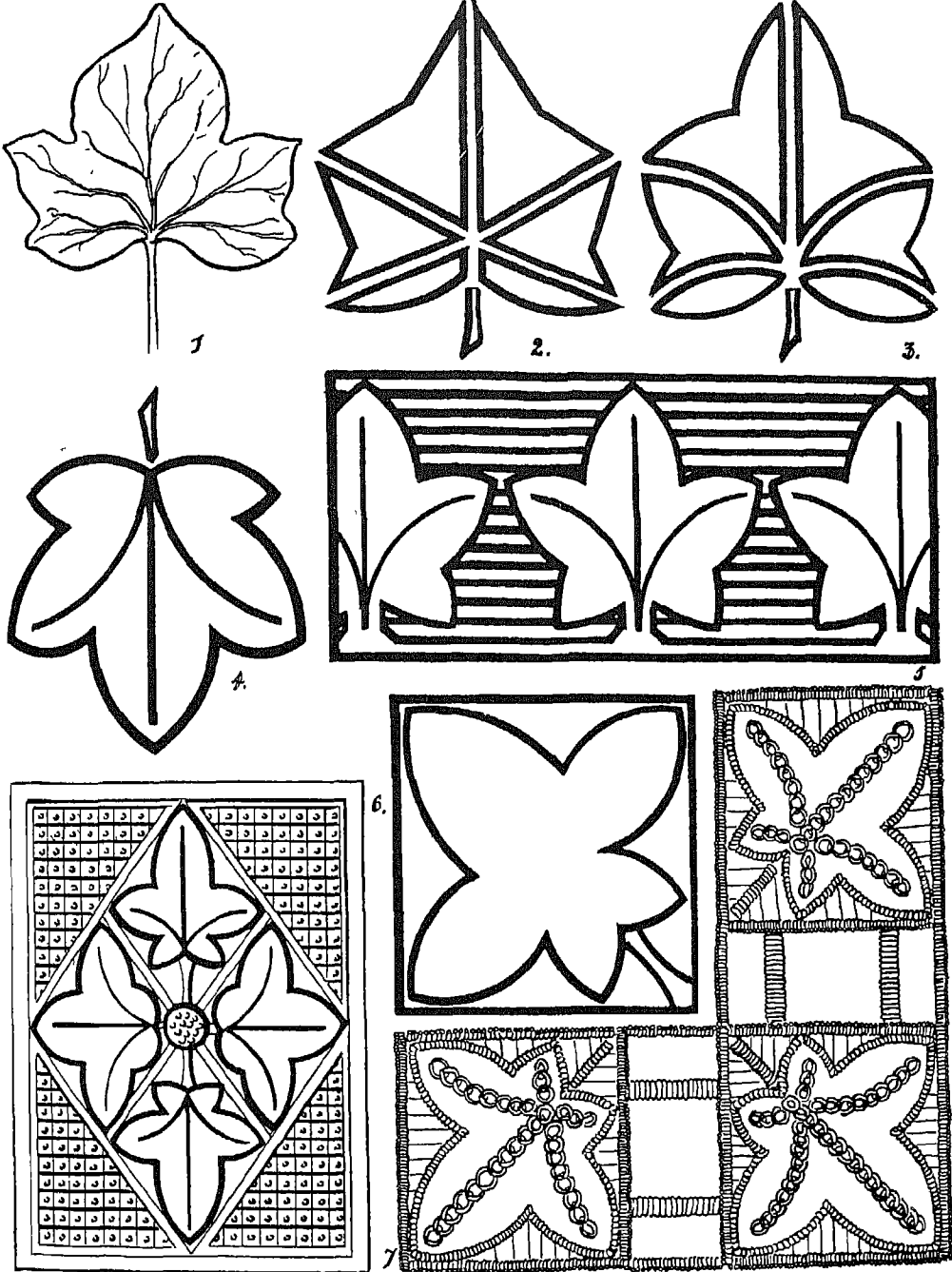
an opened coffee tin, fresh paint, the smell of gas, and burning sealing wax. Empty bottles which have held vinegar, mustard, ammonia, etc., are also suitable for this lesson

[*Reproduced by courtesy of the Royal Drawing Society*

"Snapshot Drawing" from a plate of "Skipping Lambs" by M Forster-Knight, age 17

XXX. DRAWING FROM NATURE—PENCIL

Exercise.—Provide each child with a large ivy leaf, and ask them all to draw it as they have learnt to draw leaves in previous lessons. The children should begin by placing the general leaf shape in position and then suggesting the main lines of radiation. This preliminary drawing should be placed in a rectangle at the left top side of the book The teacher will now ask the children closely to examine the leaf in order to observe the ray lines, the shapes between these lines on either side, the lobes of the leaf, and the general enclosing shape, Fig 1. These features can be used to build up a pattern, in fact many patterns can be discovered which may be used for different purposes.

First let us take some coloured papers and with our scissors cut out shapes roughly like those between the ray lines. There are six of these and we will choose orange, crimson and green to remind us of the ivy leaf as often seen in winter time. Having cut these out place them together on the book, leaving a good space between them where the ray lines should be. When we are satisfied that the pattern makes an interesting shape and colour pattern, we will fasten them down. Now our ivy leaf has become very interesting, and suggests to us that it might be arranged in other ways and be used for different kinds of decoration. For example, the rays can be

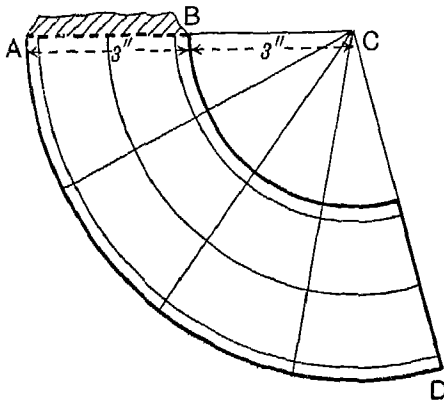
PLATE LV

DRAWING FROM NATURE—PENCIL

1 Ivy Leaf. 2 and 3 Cut-Out Pattern 4 and 5 Unit applied to Pattern.
6 Unit applied to Metal Work 7 Application to Needlework

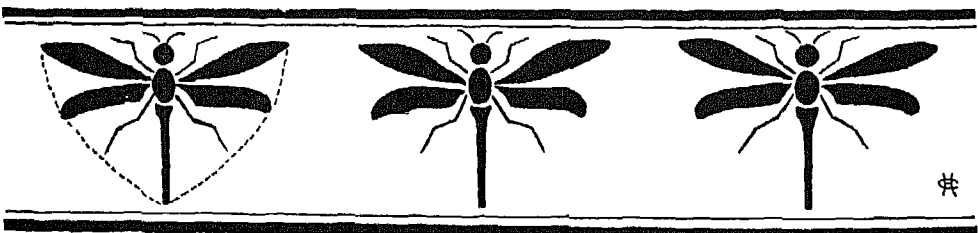
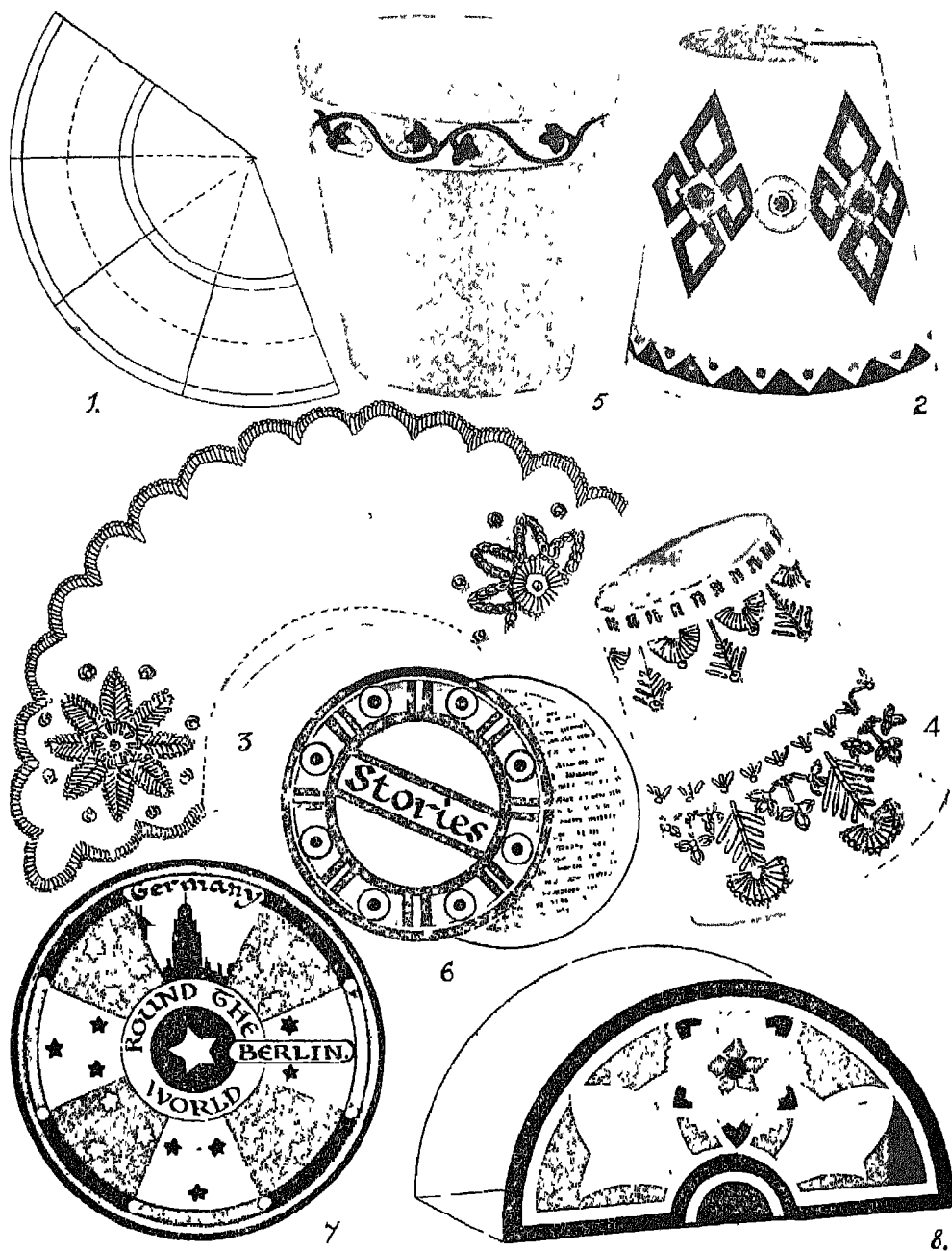
drawn as straight lines and an effective pattern made by the use of coloured cut-outs, Fig. 2. The leaf can be further suggested by a similar arrangement of curves instead of straight lines as illustrated in Figs 3, 4 and 5 Thus from our study and representation of natural leaves our knowledge of shapes and shape filling is taking a new and interesting form. Boys will readily see that inlay can take the place of coloured paper when working in wood, and that tooling will indicate these shapes in metal work The girls can use material shapes for appliqué work, or fill the spaces with suitable stitches, see Figs. 6 and 7. The drawings suitable for these purposes will afford further exercises, and where possible they should be done on the material for which they are intended

XXXI. HANDWORK—CONES AND CIRCLES

Exercise 1.—Compasses are introduced to construct the shape for a candle shade. Oiled paper is an excellent material for the purpose but cartridge paper can be used instead

PLAN FOR MAKING A CONICAL SHAPE

Near the top of the paper draw a level line AC, 6 in long, and divide it into halves With C as centre, and the pencil point of the compasses on A, describe a curve, AD, about two thirds of the length of the semicircle Join CD With the same centre draw a curve from the point B ending on the line CD These two curves enclose the shape of the candle shade. Place a flange on AB to join the model. Before cutting out the shape, draw other arcs to serve as guides for the decoration of the shade. Mark ¼ in. inside each curve already made and describe others Similarly draw a curve through the middle of the curved figure The shape can be divided into panels by judging about half of the smallest curve and drawing a line through from C Divide the halves thus made and draw lines through the points from C Four equal divisions have been made on the shape which can now be cut out and decorated

Exercise 2.—A variation of the above exercise would be to use a similar construction (to a rather larger scale) for the collar of a girl's frock, or to the same scale for a gauntlet cuff, Figs. 3 and 4. This shape inverted would make a pretty decorated cover for a small fern pot, Fig 5.

Further suggestions are shown on the Plate.

HANDWORK—CONES AND CIRCLES

1 Plan for Conical Shapes 2 Lamp Shade 3 Dress Collar 4 Gauntlet Cuff
5 Fern Pot Cover 6 and 7 Disc Projects 8 Paper or Book Rack

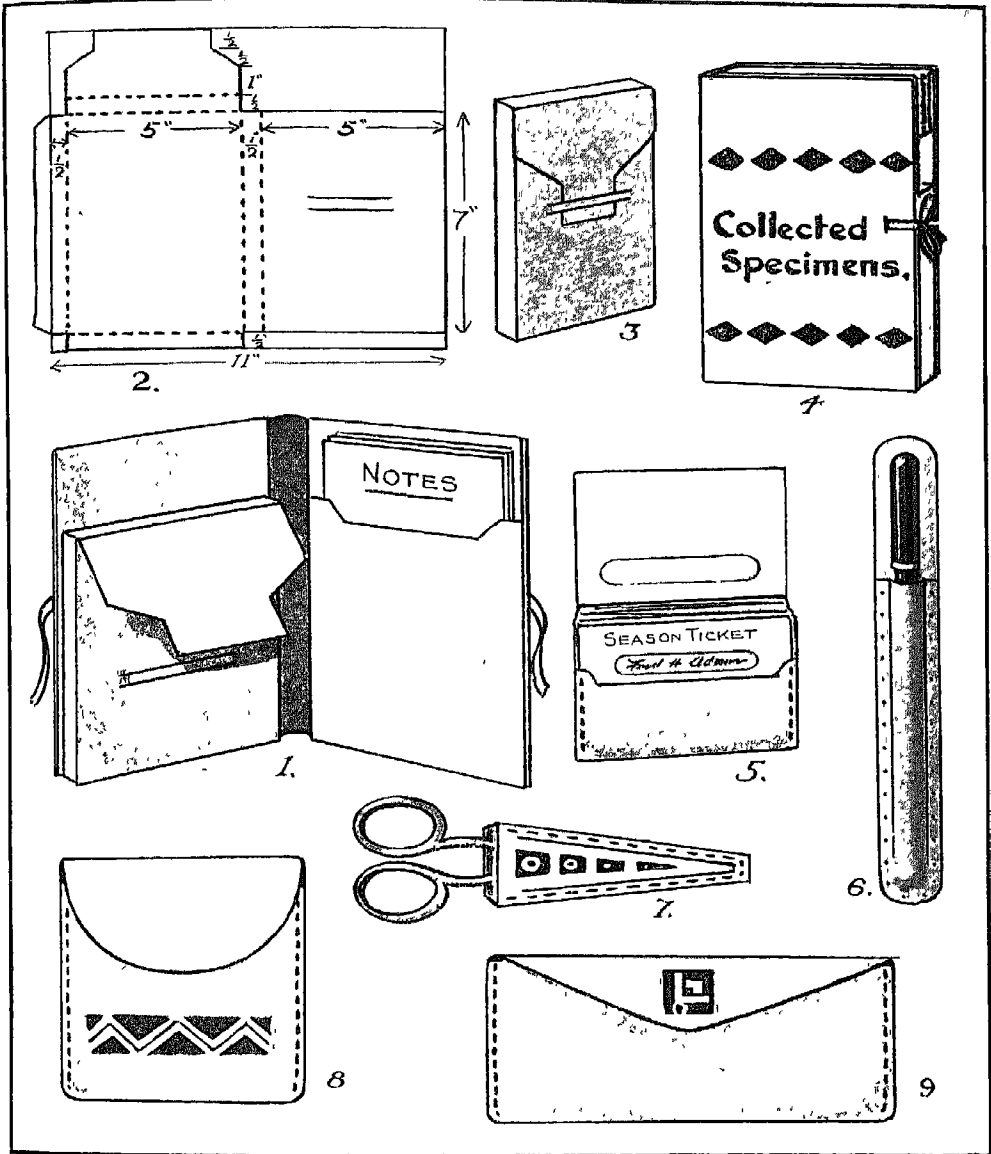
XXXII. HANDWORK—PORTFOLIOS AND CASES

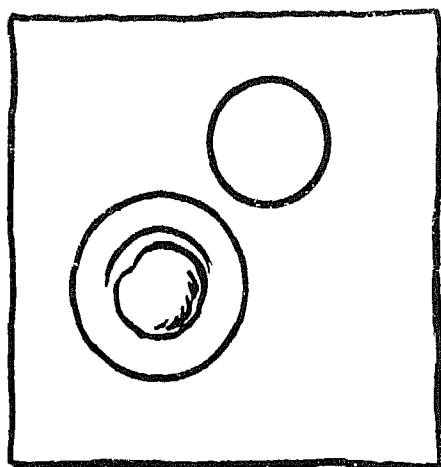
Exercise.—Proceeding on the lines of a previous handwork lesson, we shall make a portfolio from strawboard and light cardboard. Such a portfolio would be useful for preserving a collection of mounted grasses, wild flowers or seaweed The use to which the portfolio is to be put will decide its size. A portfolio having an all-over size of 8 in by 6 in. is a handy size. This will allow 7 in by 5 in for the inside container. The covers are made from strawboards 8 in by 6 in which should be fastened to a backing of bookbinders' cloth or Duxeen, leaving at least 1 in between the long edges of the covers, Fig 1 The method of construction has been previously explained in Lesson XXVIII. The boards should be suitably covered; slits must be cut and tapes to match the cover inserted for tying purposes; lining paper should afterwards be applied neatly to cover the insides.

The next step is to prepare the container which will be made from light cardboard. The all-over measurements will require material 11 in long by 10 in broad. The diagram, Fig. 2 in the Plate, indicates the method of cutting and folding Folding must be carefully done with the aid of a straight edge; no half-cuts are needed Parallel cuts should be made in the right-hand rectangle for slipping the top flap securely into it, Fig 2 It is necessary now only to fasten this container to the left-hand, inside cover A ruled line ½ in. from the edges will indicate the correct position, where it can be securely fastened with glue or strong gum Decoration and lettering will be used for the outside cover, Fig 4.

If Duxeen or light bookbinders' cloth is available for covering, other objects can be made, such as a season ticket holder, Fig. 5, a purse and a wallet, Figs 8 and 9; a fountain pen or pencil holder, Fig 6, and a scissors case, Fig. 7. It will be seen from the drawings on the Plate that some of these objects provide further exercises in stitching

XXXIII. PASTEL DRAWING—GROUPS OF OBJECTS

Preparation.—In previous lessons we have taken two objects grouped against a suitable background and foreground along the same axis; it will now be necessary to arrange groups in which the objects partly cover each other, in other words they will not stand parallel to the background. It will be useful if some of the children are asked to place the objects in position, and then view them from above in order to observe their plan A few experiments of this kind, used in connection with rough sketches either on paper or on the blackboard, will do much to obviate the common fault of drawing the objects as though they were occupying the same area—that is standing upon each other. This practice should be extended to a number of grouped objects

HANDWORK—PORTFOLIOS AND CASES.

1 Portfolio 2 Plan of the Holder 3 Folded Holder 4 Decorated Cover 5 Season Ticket Case 6. Fountain Pen Holder 7 Scissors Case 8. Wallet 9 Purse.

PLAN OF A GLASS AND PLATE

in pairs In each case coloured backgrounds and foregrounds should be provided in order to give definition to the group, and to assist the children in their observation of the relative positions of the objects.

Exercise.—Place a glass of milk and a bun on a plate in position on a foreground of green baize with a background of blue. In plan the group will appear as shown in the diagram Let the children carefully note the position of the objects in relation to each other, and note, too, the spaces between them and the background If now the children apply their knowledge to the shapes cut out of the background and foreground, the drawing of the objects will be easy. With the aid of a "finder," the shapes cut out are sharply seen if the bottom inside edge of the "finder" is raised slowly to cut out the foreground, and similarly lowered to cut out the background These outlines can be indicated in charcoal and the colours applied in the usual way, the background and foreground having first been lightly indicated around the shapes, so leaving the group in silhouette. Tone values can now be correctly perceived and more truthfully expressed, Fig 1

It will be found that, with a little patience and practice, a clearer perception of the group and a quicker and more accurate representation will be secured by dealing with the work in the manner suggested The following groups of objects are suggested for treatment:

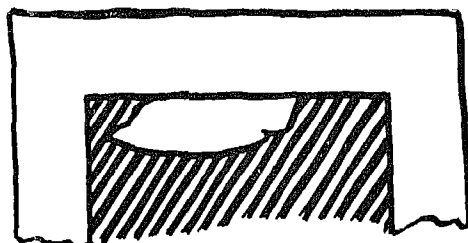
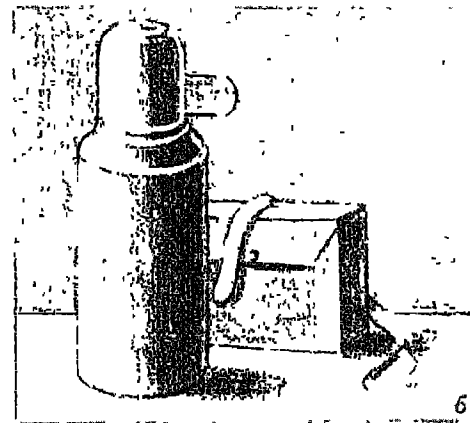
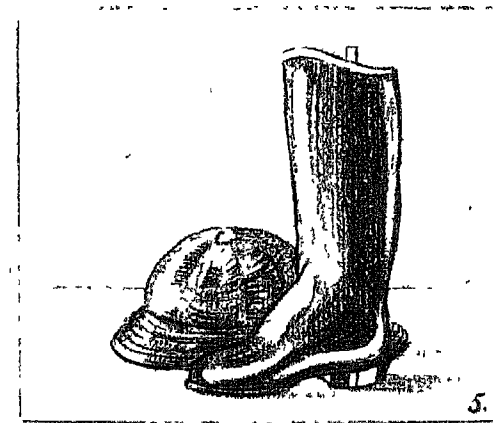
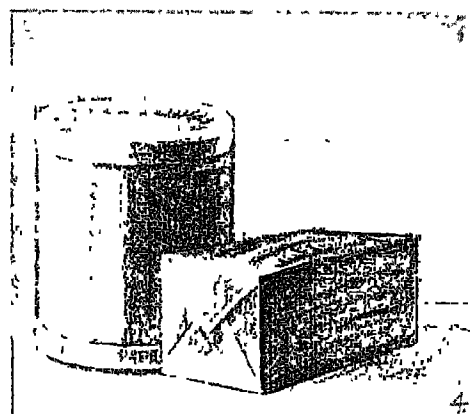
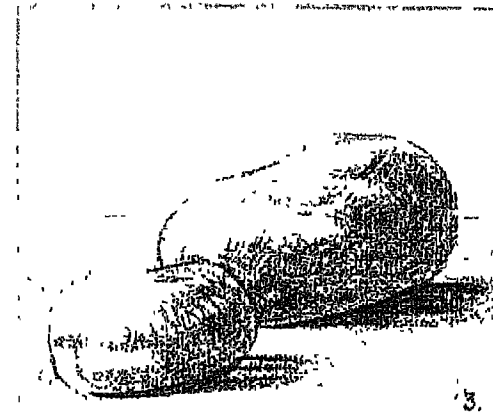
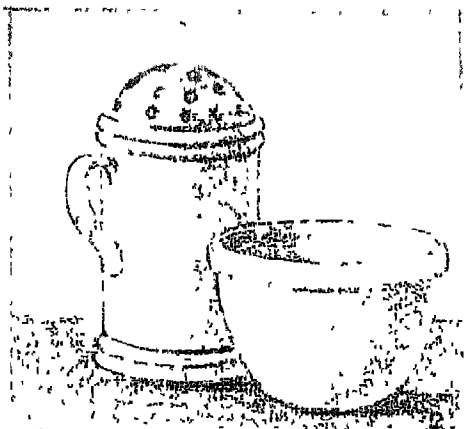
(*a*) A flour dredge and a coloured basin, Fig 2

(*b*) Two large beach stones, Fig 3

(*c*) A cigarette tin and a packet of matches, Fig 4.

(*d*) A Wellington boot (tan) and a sou'-wester hat, Fig 5

(*e*) A thermos flask and a sandwich tin, Fig. 6.

SILHOUETTE ON THE BACKGROUND AS SEEN THROUGH THE "FINDER"

SILHOUETTE ON THE FOREGROUND AS SEEN THROUGH THE "FINDER"

PASTEL DRAWING—GROUPS OF OBJECTS

1 Bun and Glass of Milk   2 Flour Dredge and Basin   3 Two Beach Stones
4 Cigarette Tin and Packet of Matches   5 Wellington Boot and Sou'wester
6 Thermos Flask and Sandwich Tin

XXXIV. ELLIPSES—PENCIL

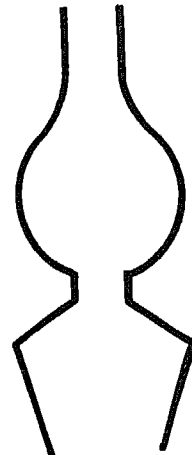
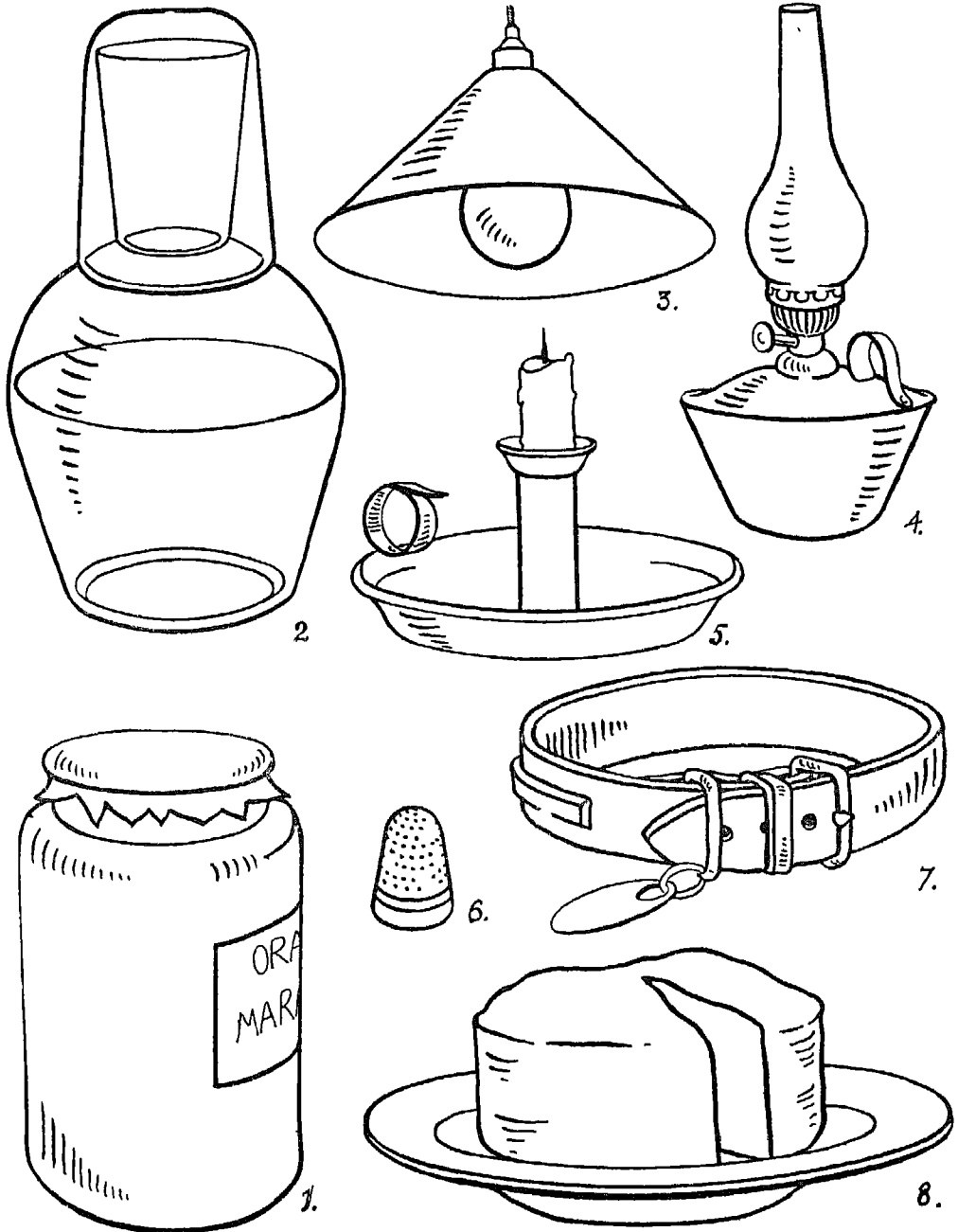
Introduction.—The pencil drawing for this year's course has dealt with rounded shapes of various kinds, and the methods employed may well be revised by the further drawing of a few objects involving the principles that have been taught. The objects chosen should have simple bold outlines such as those illustrated in the Plate.

Accurate drawing depends upon close observation Many pupils who are able to draw steady clean lines, or sweeping curves and ellipses, have not also that thoughtful habit which leads them to notice changes in shape. The subtle gradations of a curve are not easily recognised. Parts of them are frequently hidden, and care must be taken not to show them broken in the drawing It is generally best for young pupils to draw the unseen as well as the seen. This point specially applies to the drawing of ellipses which are partly hidden.

Exercise 1.—A jar of marmalade placed in an upright position will provide the class with a further exercise on the cylindrical shape with ellipses at varying heights. The label will require careful observation. The drawing should be simply built up on the lines which contain the shape of the jar, rather than by constructional methods To the outline can be added the ellipses as seen, and these also should be sketched in freely as a shape, rather than as a difficult problem in perspective The label and cover may be added by those children who feel able to manage them, Fig 1.

Exercise 2.—The drawing of a water bottle and glass supplies a variation from shapes already studied and revises many of the main features of construction in a new form. The glass presents less definite lines than those of objects previously drawn, but it will give scope for keen observation. The drawing of the series of ellipses, including the water level in the bottle, is a particularly useful exercise. Here, again, the enclosing lines are easily set down, and an effective drawing may be accomplished with little difficulty, Fig. 2.

Exercise 3.—An electric lamp is an excellent example of the cone. In the drawing of this model, observation will be keenly tested by seeking for the hidden lines of the lamp, which alone will give the correct position of the curves appearing below the top rim of the shade.

Exercise 4.—An oil lamp is shown in Fig. 4 in which the main lines are fairly simple (see diagram). The details of the brass holder may, if desired, be omitted at this stage. Girls will find an interesting example in the representation of a thimble which also is cone-shaped, Fig 6 Figs. 7 and 8 show supplementary exercises in attractive forms In the cut cake and the dog collar the ellipses are clearly defined and full of interest

MAIN LINES OF THE OIL LAMP

ELLIPSES—PENCIL

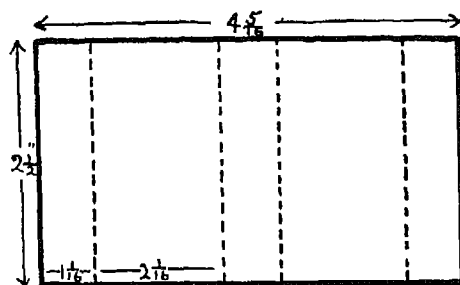
1 Jar of Marmalade 2 Water Bottle and Glass 3 Electric Lamp. 4. Table Lamp.
5 Candlestick 6 Thimble 7 Dog Collar. 8 Cake on Plate.

XXXV. HANDWORK AND PATTERN—BOXES

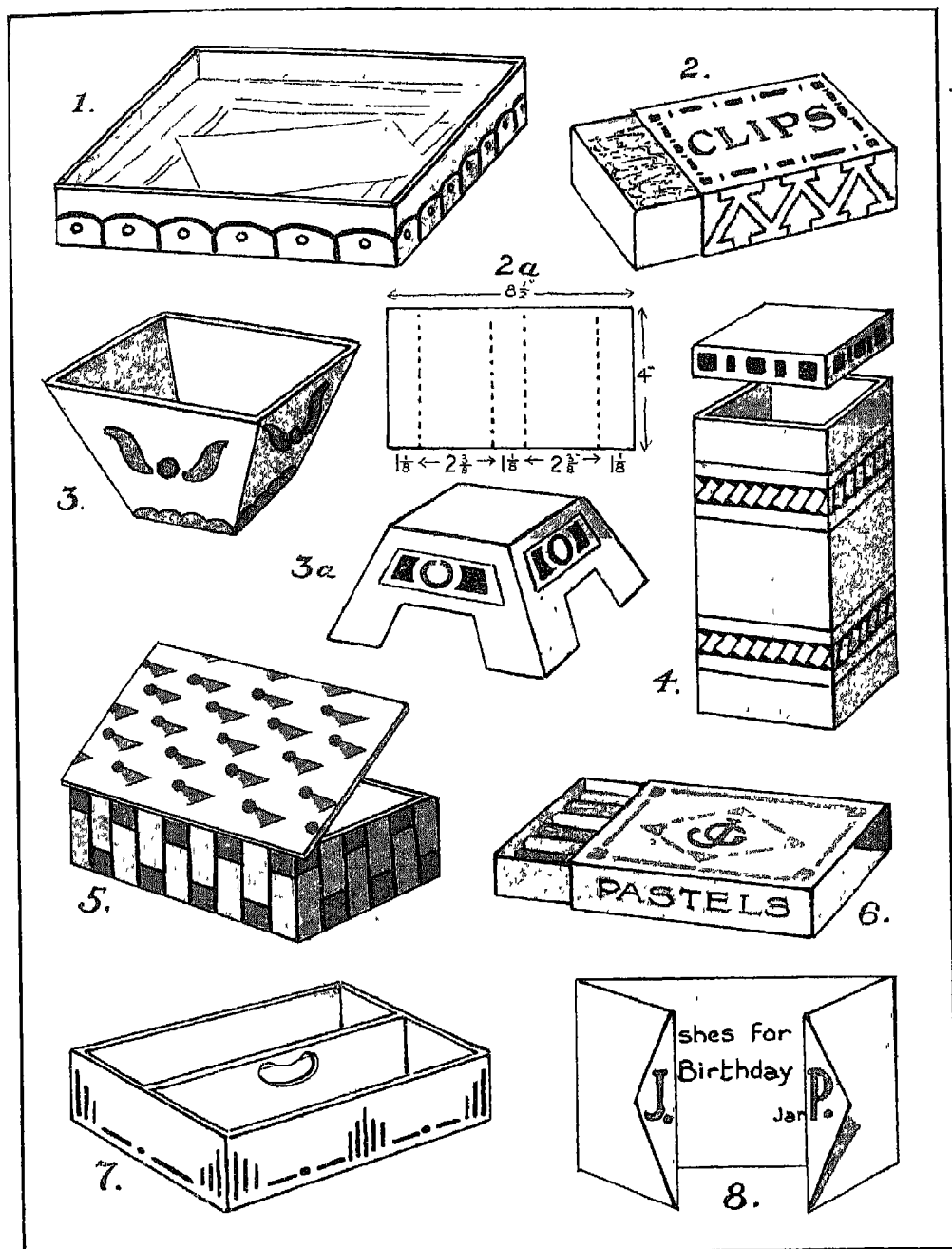
Introduction.—Preparation for making certain simple models of the box kind may be found in the proper wrapping of a parcel A large book will form a useful parcel. Let one or two children decide the size of the paper to be used. in this way measurement, folds and covering surfaces will be visualised without mechanical aid. By a few questions, the teacher will lead the children to discover the best way to cover the parcel securely and neatly. By such practice, much useful knowledge may be imparted, and this knowledge will be applied to the construction of box shapes from paper or cardboard.

Exercise 1.—Supply the children with a sheet of stiff paper measuring 12 in. by 9 in., and ask them to prepare the plan for an open box Various methods are possible, and the discovery of any of these will be of value The model should be carried to completion and decorated for use as a receptacle for papers, tickets, labels, postcards or envelopes, Fig 1.

Exercise 2.—It will now be a natural step to construct a box similar in form to a match box. The box will be planned on the lines of the previous exercise, and it measures when completed 4 in. by 2½ in, with sides of 1 in The method of folding and fastening should be that in which the flaps are fixed within the box. Half-cuts will be necessary on the outside of the folds, as the cardboard used is fairly stout The sliding cover will next be planned to fit the box, allowing for free movement it will be necessary for this reason to add $\frac{1}{16}$ in to each cross dimension. The flap in this case should be equal to one of the sides and should be fastened on the outside this will allow for the free movement of the box in the holder. With this model great care is necessary to ensure square folding, as the use of the box depends on the accuracy of its construction. The children can now prepare a label for the top of the box suitable to its use, and they can colour and decorate the sides. Such a box might be used for pastels, paper fasteners or drawing pins, Figs 2 and 6.

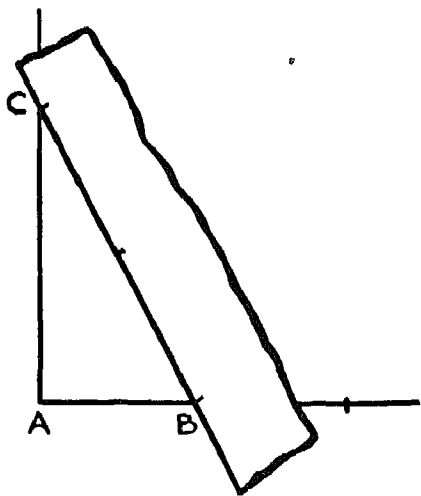
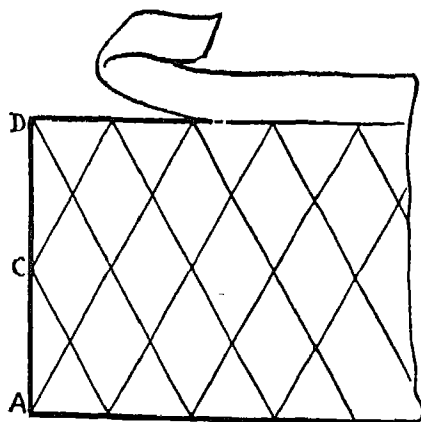
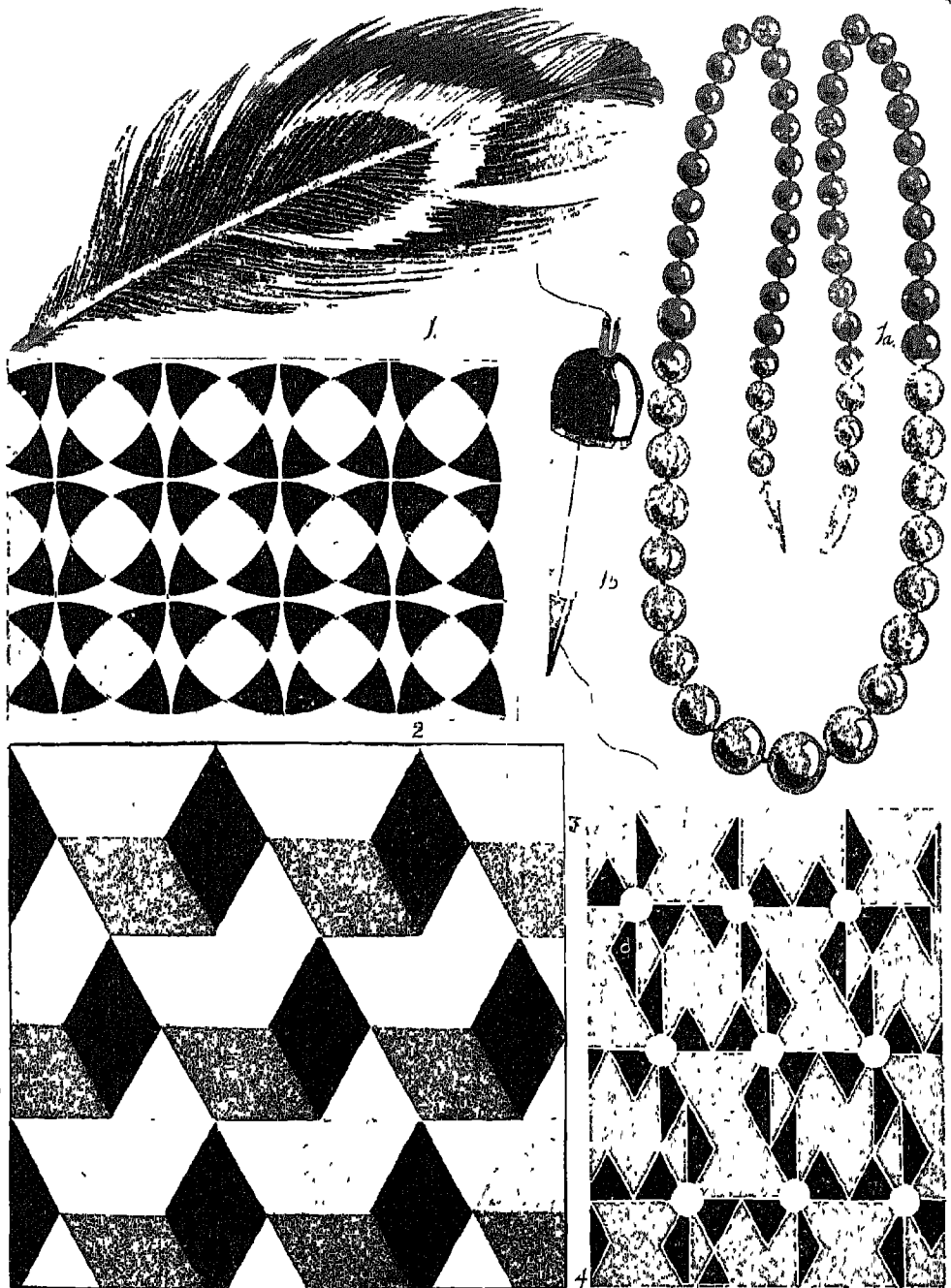
Exercise 3.—From this stage cartons of various kinds, and boxes with hinged lids or with separate covers can be devised Definite purposes can be found for all such models, Figs 3, 4, 5 and 7 The making of a greeting card as shown in Fig 8 is a pleasing variation of the foregoing exercises

PLAN FOR THE MATCH BOX COVER

XXXVI. BRUSHWORK AND PATTERN MAKING—THE TRIANGULAR NET

Exercise 1.—Distribute variously coloured gummed papers and, if possible, prepared hectographed outlines on white paper of simple coloured objects. The actual objects represented should now be displayed these may be a fishing float, a label, a feather and

HANDWORK AND PATTERN—BOXES

1 Tray for Papers 2 Box with Sliding Cover 2a Plan for the Cover
3 and 3a Box of Pyramid Shape 4 Pencil or Pen Box 5 Decorated Box with Hinged Lid
6 Box for Pastels 7 Pen or Pencil Tray 8 Greeting Card

a string of coloured beads Exhibit three of the objects in turn, asking the children to show the coloured paper they would select to be cut into the shapes of these objects. If errors arise, allow the children to place their papers against the objects in order to establish their identity. With scissors, the children may cut the required shape from their selected paper and gum it to the outline provided. For the remaining objects leave the children to make their own selection and complete their sheet. Where hectographed outlines are not provided, the children can make their colour selection, cut out freely the shape of the objects chosen, and fasten them to the paper, Figs. 1, 1a and 1b.

Exercise 2.—The children have now found that in arranging their patterns they have usually placed them in such positions to each other that some definite plan has been evolved. Thus some patterns have worked out upon a square plan, while others have been set in a criss-cross fashion This will suggest that if we first set down such a plan, we can arrange our pattern upon it We shall now make such a pattern on what is called the triangular net This will be done on red and blue gummed papers (about 2 in. square), and on a tinted paper (light ochre) in a square of 4 in. side. Mark half inches along the base line with compasses or a strip of paper, mark the length of two of these divisions from B across to the upright side at C. Mark off the distance AC on the upright line two or three times and with scissors trim off the top edge, level to the last point. Place similar points on the opposite sides and join with slanting lines in opposite directions Great care must be taken to make the plan correctly so that all the shapes shall be exactly alike. The coloured papers will be treated in the same way: by cutting these along the slanting lines, two sets of shapes will be prepared The children can now arrange these cut-outs in series of red and blue; or they can combine blue with red The division or the combination of these shapes will provide an almost endless variety of shapes and will exercise the children's creative faculty very usefully The children should devise their own patterns, but they should be reminded of the additional pattern that is made by the space shapes of the background. Most children will have looked through a kaleidoscope, and they may be reminded of the patterns of colour shapes seen in the ground glass.

MEASURING THE SIDES OF A RECTANGLE TO MAKE A NET

COMPLETING THE NET

BRUSHWORK AND PATTERN MAKING—THE TRIANGULAR NET

1 Feather   1a. String of Beads   1b Fishing Float.   2, 3 and 4 Cut-out Patterns.

FOURTH YEAR'S COURSE OF DRAWING AND HANDWORK

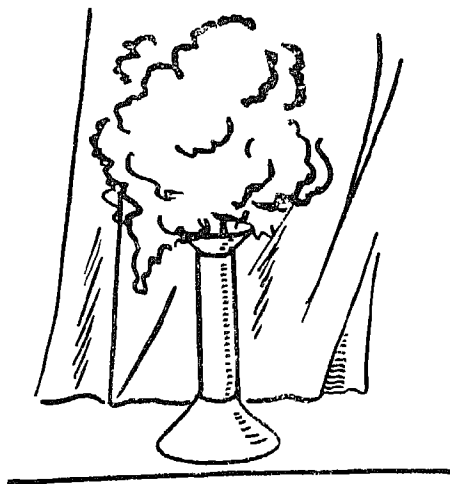
I. BRUSHWORK AND PATTERN MAKING

(Colour Plate No 167 A in the portfolio)

Introduction.—The work of the previous sections of this course has been devoted largely to the realistic representation of objects in differing media, assisted by forms of handwork and pattern making. This training should have resulted in increased observational power on the part of the children, and should have provided the requisite practice for a fair standard of graphic expression. The training, however, is merely a preliminary to the ultimate aim of the course The drawing lessons should lead to some definite and intelligent appreciation of both the form and the colour which play a continuous and vital part in our lives The appreciation of form and colour must be trained, and such training is achieved on a national scale only during the school life of the children This aspect of the drawing lesson gives it an important significance, and therefore suggestions will be given in this final year of the course for new applications of the old forms, a considerable departure from the drawing of purely objective shapes, and further opportunity for the exercise of the imagination.

Exercise 1.—At this stage the knowledge of colour selection and colour matching should be further extended by the construction of a colour scale to include both the primary and secondary colours on one sheet, Fig 6 on the Colour Plate This sheet can be used permanently for reference, and by its aid the children will acquire the power to discriminate and select their colours Such knowledge should render the children independent of the teacher's direction as to the selection of tone values. The scale should be constructed on the lines indicated in Lessons XI. and XXVII. of the Third Year's Course. In each case the key colour, marked K, is set down, and the tints and tones are placed above and below This exercise, far from seeming laborious, proves fascinating and attractive to children. It can be particularly effective if the teacher is provided with a book of the *Ostwald Coloured Papers*, from which the children may select tints and tones.

Exercise 2.—Either by hectographed copies or by the use of the blackboard, prepare drawings of the simple outlines of a football cap and shirt for boys, and of a school hat, scarf, and sports coat for girls, Figs 1 to 5 Using these outlines, the children can carry out a colour scheme chosen from their scale.

The scheme should be entirely of their own choice and founded upon their own ideas of colour selection and harmony. The children should show which colours and tints or tones they have chosen. Before the actual colour to be used is applied to the drawing it would be a good plan to show, near the outline drawing, the particular colour selected from the scale This exercise should indicate the children's appreciation of colour A few copies might be exhibited for discussion as to their merits or demerits. Reasons will readily be forthcoming to show why some copies are preferred over others, Figs. 2 and 3

OUTLINES OF CURTAIN, VASE AND FLOWERS

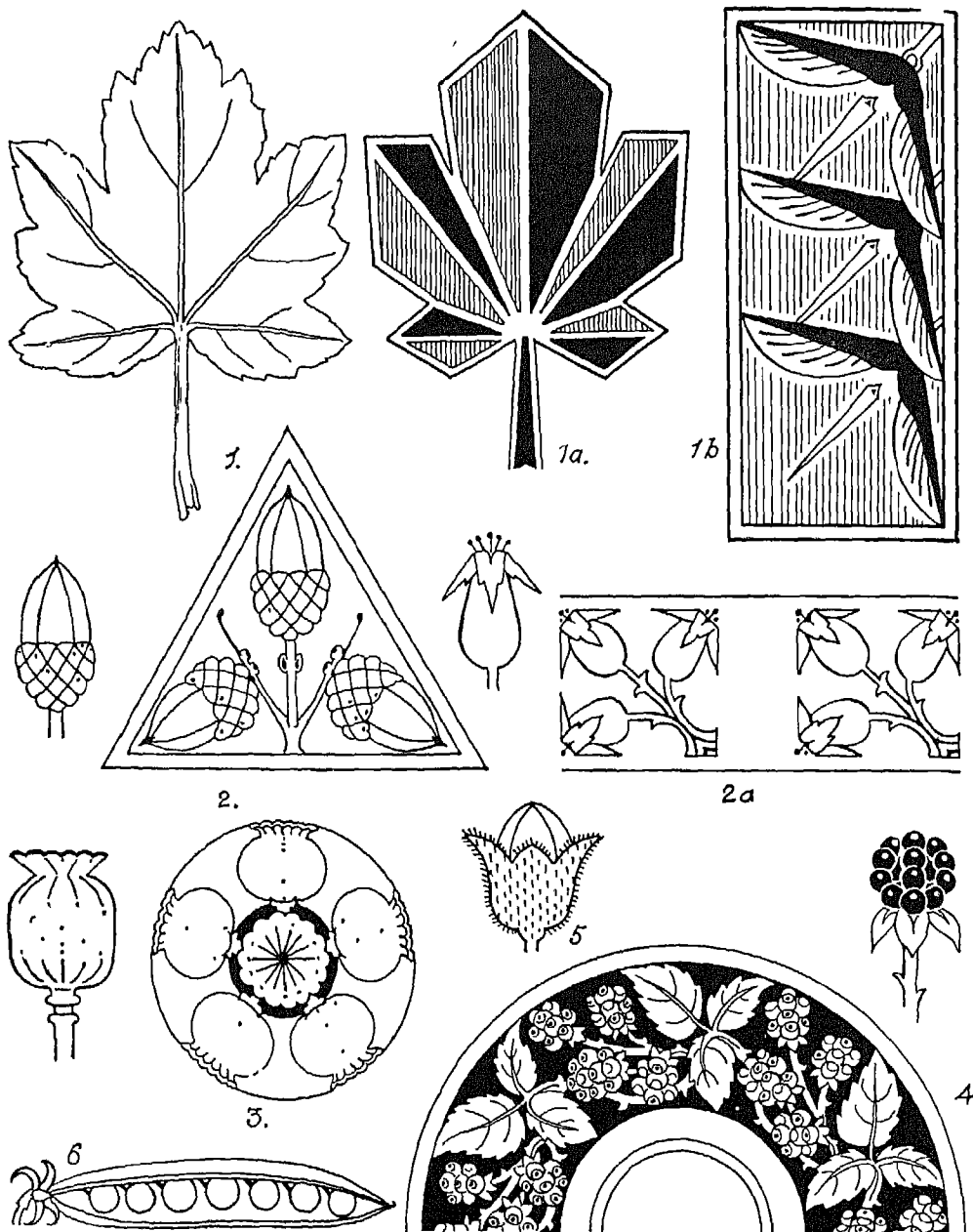
Exercise 3.—Suspend before the class a piece of tinted material—pale orange, mauve, etc —to suggest a curtain The teacher will propose that a vase of flowers might be placed against this background, Fig. 7 What colour shall the flowers be? The children will make a rough sketch showing the material, a simple vase, and an outline of the shape for the colour of the flowers. A single line will show the level of the table on which the vase stands First wash in the correct tint of the material, and from the scale choose a colour which will harmonise with the background The flowers need only to be indicated by a general colour mass. This having been done, the children will like to make the vase and table cover harmonise with their surroundings A colour scheme of some kind will result, and the children will realise how much depends on the thought and care given to the selection of colours.

II. DRAWING FROM NATURE AND PATTERN MAKING

Exercise 1.—Provide the children with sycamore leaves and let them rapidly draw a copy of one The principal aim of this part of the lesson is to afford pupils the opportunity of revising what they have learnt about the characteristic parts of leaves of this kind Draw the ray lines leading to the five points which terminate the leaf lobes, and mark the places where the curved hollows separate the lobes Having first planned the work in this regular way, the outline can be quickly drawn, Fig 1, Plate LXII

Near this natural form of the leaf let the class repeat the plan of the leaf by using the main characteristics as the framework for a pattern shape The ray lines will divide the space into interesting shapes, particularly if the leaf edge is blocked in as a five-sided figure. The five lobes are the centres of interest for the pattern The children can fill in the shapes either with coloured gummed paper or with a flat wash of colour, Fig. 1a.

Exercise 2.—The seed pod of the sycamore forms an attractive *motif* for drawing Its main features are readily observed and easily expressed as a pattern. The children can proceed a little farther with their pattern work by repeating the unit to produce a border, Fig 1b.

Many of the larger seed vessels can be used in attractive pattern work Sometimes it is advisable to cut through the seed vessels and make patterns from the drawings of the sections There are a number of suggestive drawings in the articles on nature study in the first four volumes of this work Other examples of suitable specimens for drawing and pattern making are illustrated on the Plate.

DRAWING FROM NATURE AND PATTERN MAKING

1 Sycamore Leaf
1a Pattern from Sycamore Leaf
1b Pattern from Sycamoro Seeds
2 Pattern from Acorn
2a Pattern from Hip
3. Pattern from Seed Case of Poppy
4 The Bramble used as a Pattern
5 Beech Nut
6. Pea Pod

III. DRAWING FROM MEMORY—PENCIL

A dictation exercise.—Dictate to the class as follows —

(*a*) Across the middle of the paper draw a line which you think is 7 in long, and on this line mark the inches

(*b*) From the third inch on the left draw an upright line 5 in long Mark 1 in. from the top of this line and join the point to the left end of the level line.

(*c*) From the fifth inch on the level line draw an upright line 4 in long and mark 1 in from its top.

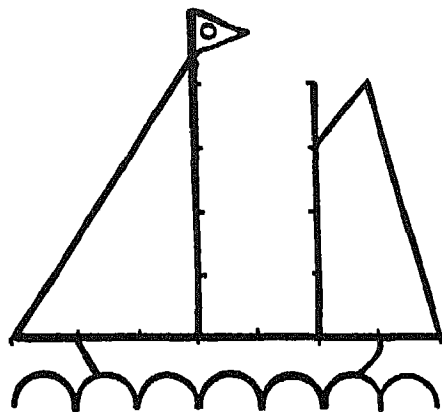
(*d*) Join this point to another point $1\frac{1}{2}$ in. to the right of the top of the second upright line. (The line joining these points is a sloping line)

(*e*) Join the end of the sloping line to the right-hand end of the level line.

(*f*) Draw another level line 1 in. below the first and mark off the inch divisions as before.

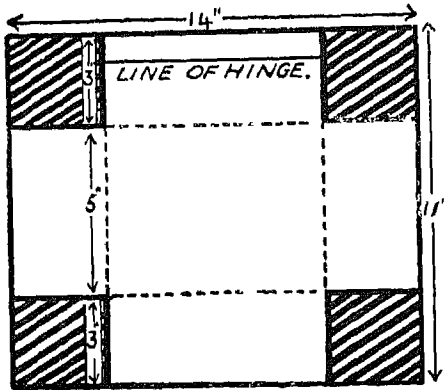
(*g*) Draw curves between each of these points so that the top of the curves is halfway between the level lines.

(*h*) Now put in the two remaining lines which will complete the drawing of a boat

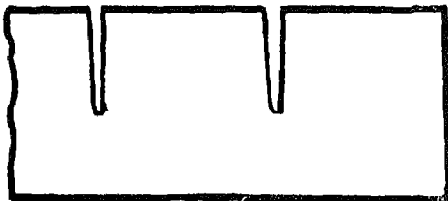
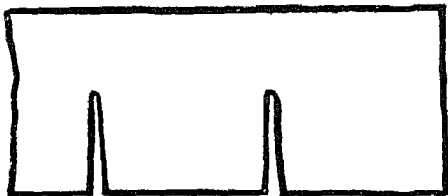
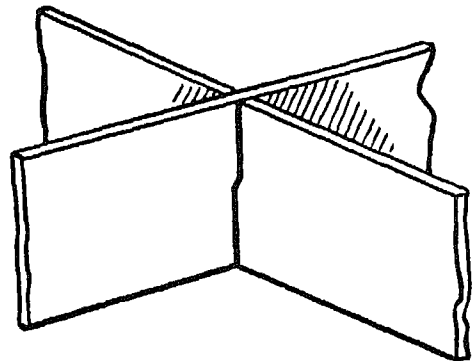
(*i*) Draw the flag and give the boat a name

A DICTATION EXERCISE

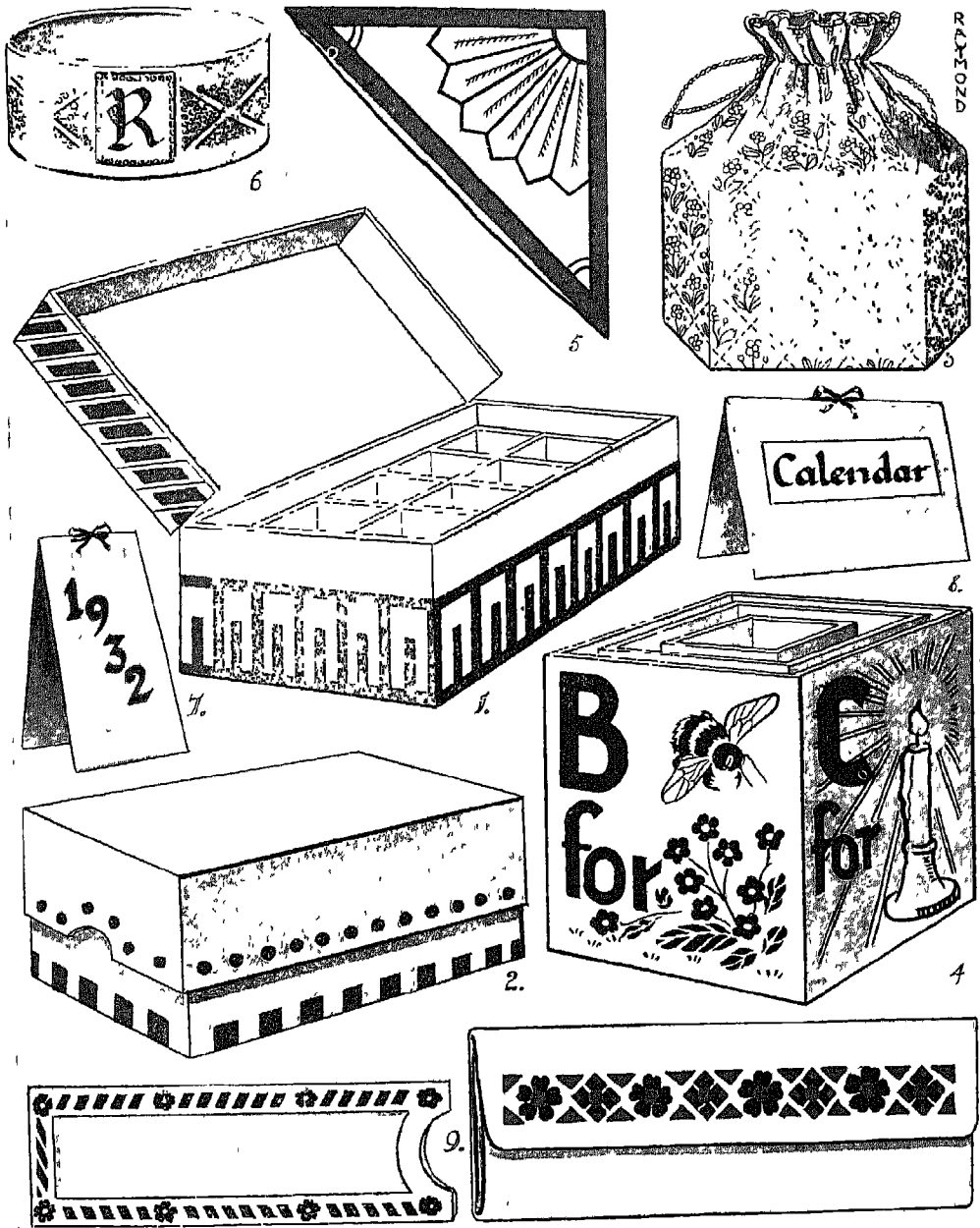
An exercise on hearing.—In this exercise the children are to draw a picture which is suggested to them by hearing a sound Ask the class what picture would be suggested to them if they were sitting in a room and heard the bell of a fire engine or an ambulance car. Let the children close their eyes and listen The teacher bounces a ball on the floor, puts the ball away and asks the children to draw a picture of anything that the sound suggests Other sounds can be made by rattling a spoon in a cup, using a scrubbing brush on a table, locking a cupboard, cracking a small whip, firing a toy pistol, etc

IV. HANDWORK—CARDBOARD BOXES

Exercise 1.—In continuation of the use of cardboard for making models, a further exercise is provided by the construction of a box with an overlapping lid, which may be used for gloves, stationery, seeds, etc. The body of the box is cut from a sheet of cardboard 14 in. by 11 in , and is planned as shown in the accompanying diagram. It is advisable for a specimen box to be used for investigation by the children. The over-

PLAN OF A CARDBOARD BOX

PLAN OF THE CARDBOARD BOX LID

lapping lid is made with a flexible hinge of bookbinders' cloth which is fastened 1 in below the top of the back of the box, as shown in the diagram. A sheet of cardboard 10¼ in by 7¼ in. is needed for the lid A line drawn 1 in from each of its sides will indicate the depth of the lid and leave just sufficient room for it to fit nicely on to the box. For practice in binding, and in order to give a good finish, flaps are omitted, instead of flaps the joining edges are bound by strips, after an attractive covering surface has been put on the model This may be done with a good wallpaper design, by a flat wash and coloured cut-outs arranged into a pattern, or by marbling. This last method, which is frequently used for end papers of books, can be effectively carried out by children. If compartments are required for the box, they must be made from stiff cardboard and must fit tightly Cross sections can be fixed by cutting the sections halfway through and fitting them together In this way there will be provided an even number of nests suitable for birds' eggs or seeds, Fig 1 on the Plate

HOW TO CUT THE SECTIONS OF THE BOX

HOW TO FIT THE SECTIONS OF THE BOX

Exercise 2.—In continuation of box making with stiff cardboard, other useful objects may be constructed These may be done by the class in sections, so that greater variety is obtained. A box for writing paper with a slip-on lid can be given to one section. The

HANDWORK—CARDBOARD BOXES

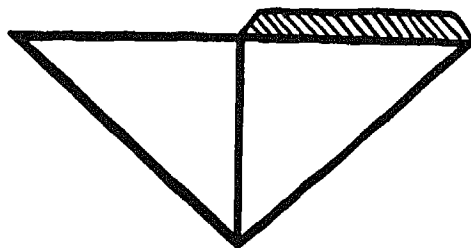
1 Box with Nests and Overlapping Lid.
3 Hexagonal Workbox
5 Corner Bookmark
7 and 8 Decorated Cards

2. Box for Writing Paper
4 Set of Boxes.
6. Serviette Ring
9. Comb Case and Pochette

plan of the model is simple, and when ready for folding the corners will provide a further exercise in binding with cloth to strengthen the box. The whole should be covered with tinted wallpaper and decorated with cut-outs or direct pattern, Fig 2.

Another section of the class could be given a hexagonal workbox to construct An illustration of the plan should be shown on the blackboard Half cuts will be made for the vertical sides, and these should be kept in position with bookbinders' cloth. The box should now be covered with material, which may be manufactured print. This should be about 8 in in length, and wide enough to cover two or three sides. At the bottom, 1 in. must be left for over-lapping, and at the top, 4 in for the cover Paste the sides of the box and fasten the material cleanly and evenly to the sides. When all the sides have been covered, the edges will be neatly joined and gathered together to form a bag fastened with cord. The base overlay will be carefully folded and glued down, and covered with a white cardboard shape to give a neat finish, Fig 3

PLAN FOR A CARDBOARD HEXAGONAL BOX

A set of cardboard boxes of graded sizes might occupy the third section of the class. The boxes should be graded to slip into one another, and when finished should be decorated with an alphabet, or with pictures from an old toy book, Fig 4

PLAN OF A BOOKMARK

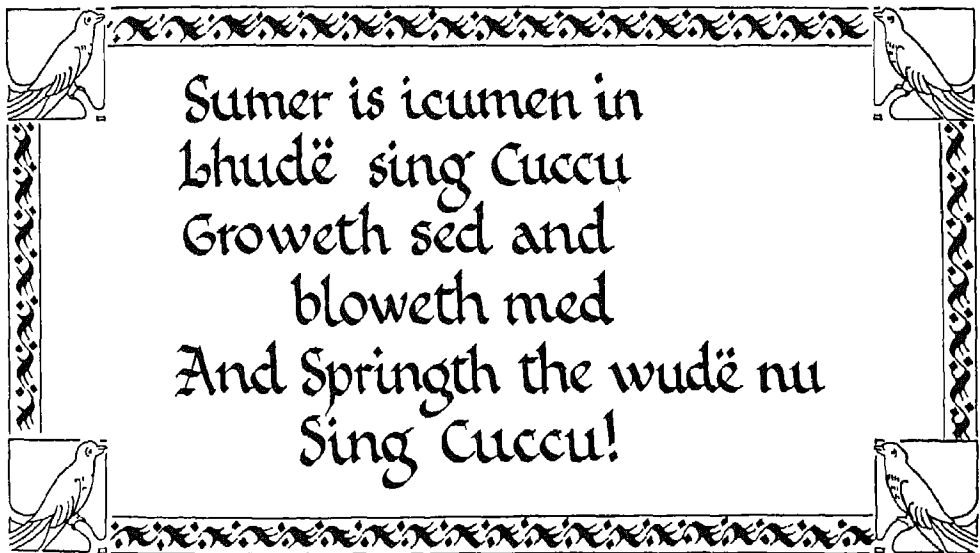
In the Plate are indicated a few additional suggestions which could be worked in paper by those children not provided with cardboard. A corner bookmark can be made from a triangular piece of paper folded and gummed along one edge as shown in the diagram, and effectively decorated, Fig 5. A comb case, serviette ring and calendar cover are other simple objects which could later be made in suède, Figs. 6—9.

V. LETTERING—PENCIL AND PEN

Introduction.—Further examples of the simple wire forms of Roman type and letters are shown in Figs 1 and 2 Children find lettering with pencil and pen of absorbing interest, and the practice of it has great educational value. The use of lettering in connection with the drawing and handwork lessons can be suggested incidentally as the opportunity arises, although an occasional formal lesson should be given in order to correct faults and ensure that the work is done on sound lines. A carpenter's pencil is

ABCDEFGHIJKL
abcdefghijklmnopqrstuvwxyz 1
MNOPQRSTUV
abcdefghijklmnopqrstuvwxyz:
WXYZ QUEST ?
2.
1234567890 ½ ¾

3

Sumer is icumen in
Lhudë sing Cuccu
Groweth sed and
bloweth med
And Springth the wudë nu
Sing Cuccu!

Lettering—Pencil and Pen

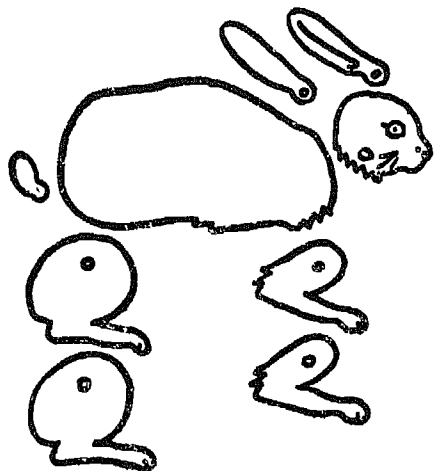
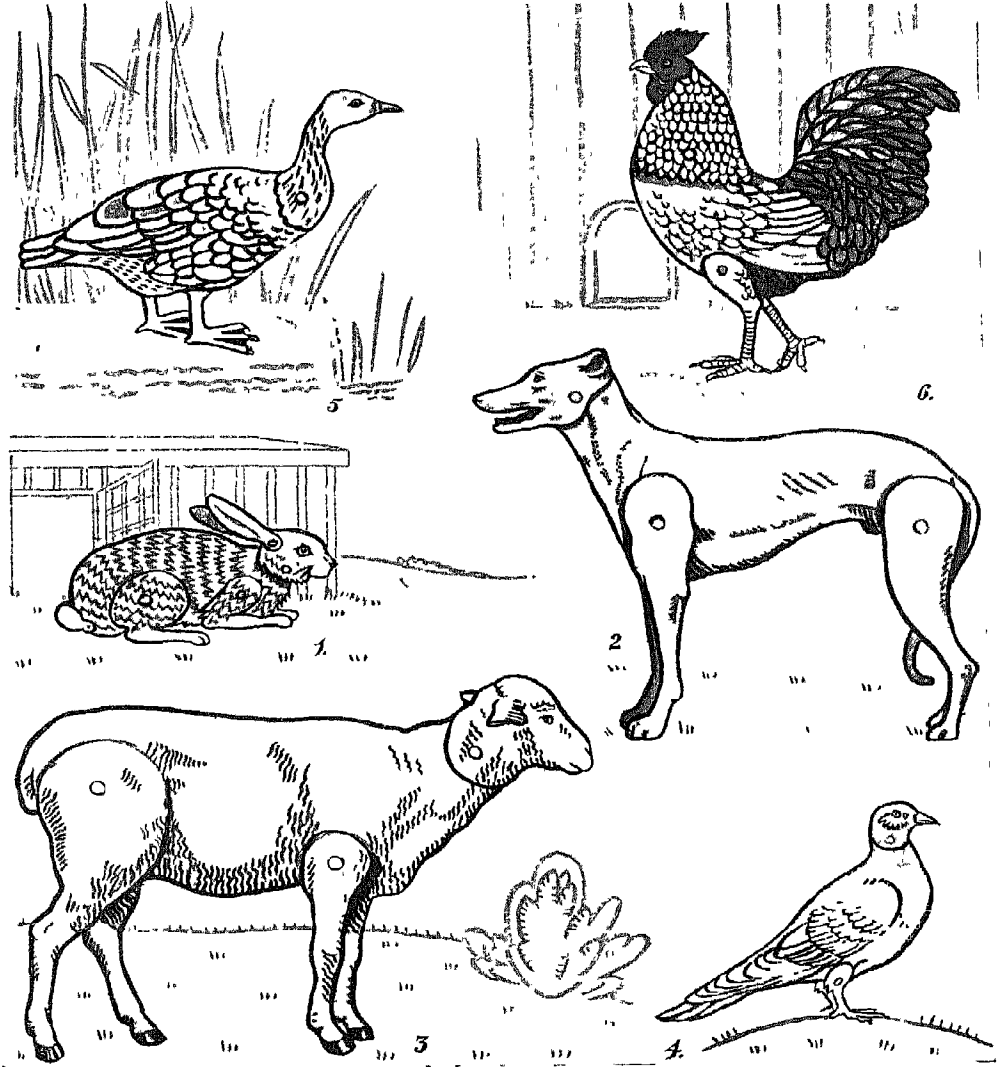
1. Wire Form Alphabet and Pen Lettering. 2. Wire Form Figures
3 Specimen Lettering with Decoration.

an effective tool for beginners, and many grades of steel pens are available for the purpose. Next to the quill, the reed pen, cut from light bamboo cane, is probably the finest tool for lettering, and by its use the most artistic and finished results are obtained

Exercise 1.—Let the children practise in script a few characteristic examples of capitals and small type letters, drawing them in the wire form; these may be individual letters or figures, or they may be combined into words and sentences. Having accomplished this, the pupils may repeat the exercise by using their pen to indicate the various strokes required to produce the letters in their best forms The children should be reminded of the important part played by the square and the circle in the formation of their capitals While shaping the letters they must remember to keep the pen exactly at the same angle for thick downward strokes, for thin cross strokes, or for curved letters. By using the wire letters as a guide these strokes should not be difficult It is important that the children should understand that the shapes are founded upon script, and that they must be perfectly upright An example of the application for a literary extract decoratively mounted is given in the Plate

VI. HANDWORK AND COLOUR—ACTION FIGURES

Introduction.—In an earlier part of this course the children constructed from cardboard action figures which were intended to assist them to illustrate movement in their imaginative drawings By the use of these jointed figures, the characters which they wished to draw could be posed and their actions expressed more accurately, at the same time interest and novelty were introduced, and imagination was more strongly stimulated Children will now find great pleasure in constructing action figures of their favourite animals To ensure the happiest results, the children should decorate their models in bright colours, and where possible indicate surroundings which are associated with the animal represented.

Exercise 1.—Let the children draw on cardboard an outline shape of the animal they wish to make into a model They must first decide which parts of the model are to be jointed; these will usually be the head and the legs, but it is a matter which should be left for the children to decide, for they may have original ideas which they wish to express—and originality is the basis of success in all drawing and handwork Having decided which parts are to be jointed,

PARTS OF A JOINTED RABBIT

HANDWORK AND COLOUR—ACTION FIGURES

1 Rabbit 2 Dog 3 Sheep
4 Pigeon 5 Goose 6 Cock

the particular shapes should be cut out, not forgetting the extra pieces to form the joints. The illustration on page 210 shows the preparation of the parts for a jointed rabbit In this case, not only the head and legs are jointed, but also the ears and tail. With this model an ingenious child would express effective and amusing action The joints can be best secured with metal eyelets made with a punch, or they may be fastened with silk thread Glass beads can be used for the eyes A similar construction will serve for any animal or bird which the children have chosen to make The finished models will stand upright in a little clay or plasticine fastened to the feet, and characteristic poses can then be given to them, Figs. 1—4

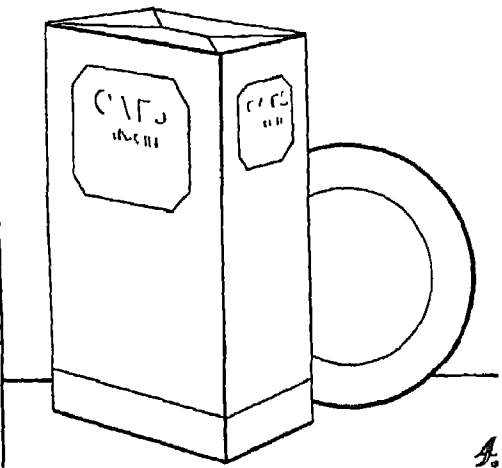
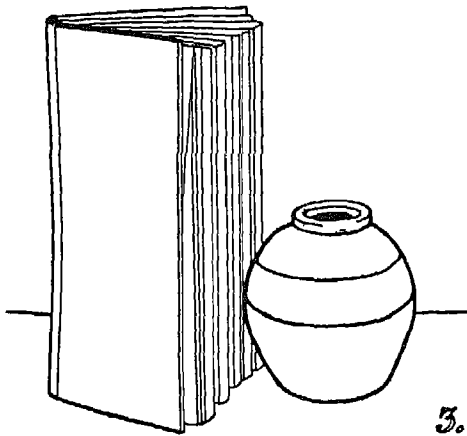
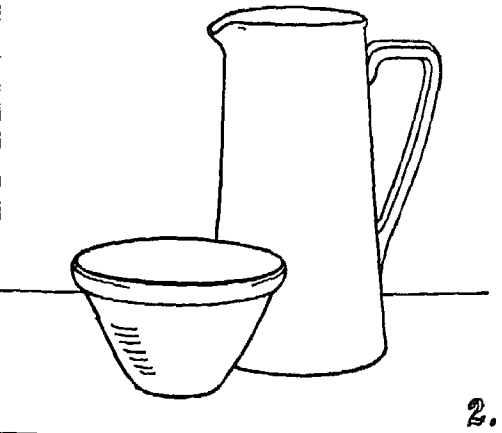
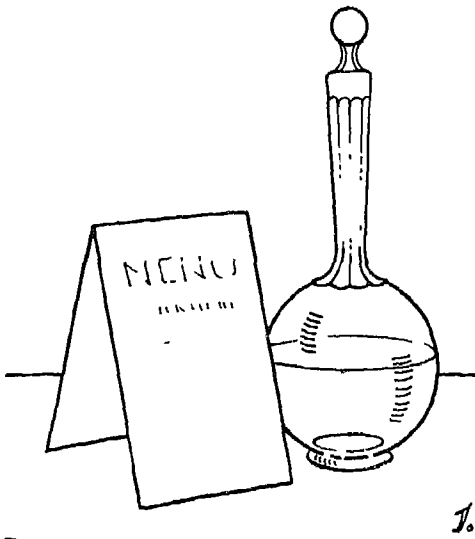
It is possible that simple projects suggesting surroundings associated with the animals can be made from the surplus cardboard—the front of a kennel for the dog, a fence for the goose, the front of the hutch for the rabbit, a perch for the bird, etc, Figs 5 and 6.

Exercise 2.—In order to make their models more attractive and lifelike the children will enjoy colouring them Pastel colour or water colour may be employed, but the best results will be obtained by using poster colours, as these are opaque and give a flat surface when dry. A covering of clear varnish applied with a broad brush will render the colour permanent Texture and shading are to be avoided; the colour should be applied in flat shapes and give a toylike appearance If children attempt to use a pattern scheme in the decoration of their models they should be encouraged; for the development of the sense of pattern allied to imagination is of great value Boys owning fretwork sets will quickly realise that they can make effective models of animals and birds at home.

VII. OBJECT DRAWING—PENCIL

Introduction.—Preparation for the drawing of two objects forming a group has been made in the teaching of pastel drawing, page 192. The group should be well placed, and its position and general shape clearly defined by a background and a foreground. The children have now become accustomed to observe on the background and foreground the shapes cut out by both objects and spaces, and object drawing cannot be satisfactorily done without observing the shapes. In order to assist the correct perception of a group of objects, they should be viewed under favourable and helpful conditions To place the objects casually on a table or a desk is distracting, and adds to the difficulty of drawing; while, on the other hand, a group carefully arranged invites close attention, and assists the children to observe the correct values of form and colour

Exercise 1.—Place a menu card and a decanter in position as suggested above. Remind the children of the method used in drawing groups of a similar kind in pastel, groups in which shapes were considered in relation to the background and to the foreground. Space shapes are as important as object shapes The menu card cuts out a clean shape, it defines a good space shape between itself and the bottle, which in its turn shows its leading lines sharply against the background. These shapes lead to the ground line, and comparing it with the group, the points of intersection are quickly seen The use of a paper "finder" is extremely valuable for observing the group exactly as it should appear when drawn. Proceed to connect the shapes on the foreground with those already made, particularly noting the points of contact The general shape of the

PLATE LXVI

OBJECT DRAWING—PENCIL

1. Menu Card and Decanter
2 Pudding Basin and Jug
3 Book and Jar
4 Carton and Porridge Plate.

group is thus completed and the other features of interest can then be added. By working on the lines suggested in this and former lessons it will be realised that the edges of the card (which form a triangular prism) can be drawn without a knowledge of the difficult principles of perspective which the prism presents. Finally, the children should use their "finders" to compare their drawing with the view of the group as the "finder" presents it.

Exercise 2.—A pudding basin and a milk jug standing on the foreground compose the next group which is to be drawn by the same method, Fig 2 Correct placing of the drawing will be aided by the consideration of a plan of the group, coupled with the careful observation of the points of apparent contact. (See page 194). When these preliminary steps have been carefully taken, the group can be completed. It may be necessary, however, to remind the children of their former lessons on ellipse shapes and handles It might be advisable to begin the exercise by devoting a few minutes to the drawing of ellipses, with some children it may be necessary once more to show them the hoop in various positions.

Other groups of two objects might be arranged as follows —a jar with a book standing on its short edges, Fig 3, a porridge carton and plate, Fig 4, a hot water jug with a bowl, and a lady's bag and hand glass.

VIII. BRUSHWORK AND PATTERN MAKING

(Colour Plate 167 B in the portfolio)

Introduction.—It has been shown in our drawing from nature that leaf forms have characteristics which suggest ideas for the making of patterns. Brushwork affords great variety and scope to pattern making based on leaf form. Show the children a few specimens of wallpapers decorated by leaves and flowers. They will note that the objects depicted are rarely of the same colour as the natural forms, but they are treated as colour patterns, at the same time retaining, more or less, their original shapes

Exercise 1.—Supply each child with a leaf from a nut tree (hazel) They are to look for the main features of the leaf and imagine these features changed into a colour pattern, *Figs 1 and 2 on the Colour Plate* In former lessons they have made shapes with coloured papers, and have harmonised these into simple colour schemes; they are now to apply shapes and colours with the brush in order to make their leaves into patterns Let the pupils make a drawing of the pattern scheme which is to be the plan of their work This should be a block drawing of the shape; and in choosing the pattern to be made within the general shape they should think of their paper cut-outs Each child should prepare his own pattern and express his own idea of a pleasing arrangement. Having arrived at a scheme, however simple, they should now colour the pattern, using not more than three colours The children should be reminded of the use of the background as forming part of their colour scheme The colour should be put on in a flat wash

Exercise 2.—In this exercise the children can make use of the pattern produced in the former exercise to decorate a border, by utilising this pattern on a smaller scale, as the unit for decoration. Arrange the general plan of the work together with a small scale unit of the proposed leaf form This unit should be cut out to serve as a template for

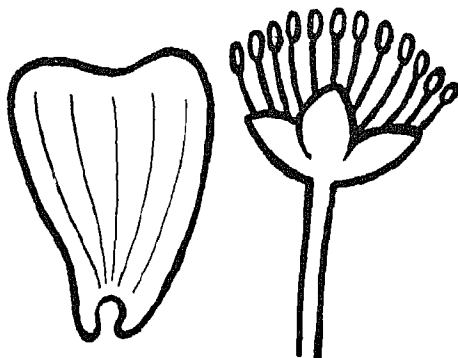
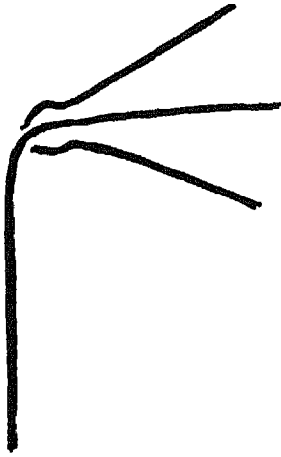
producing other units of the series, or tracing paper may be used instead A few enterprising children may think of the nut or the catkin belonging to the tree as suitable subjects for drawings to be introduced into the pattern Such variety and originality should be encouraged, Figs. 3, 3a and 3b on the Colour Plate.

Exercise 3.—Colour and pattern making may be applied in a variety of forms. All-over patterns introducing the principle of the alteration and contrast of colours offer great scope for the decoration of objects. This form of colour work is frequently seen in wallpapers and fabrics, Fig. 4 on the Colour Plate. Suggestions for colour schemes may be supplied from a collection of autumn leaves; spot and line patterns and colour shapes in endless variety can be produced from the observation of natural plant forms, Fig 5 The search for and the application of these plant forms to pattern work will enable the children to make their own discoveries in this fascinating form of colour work, and the results will be much more satisfactory than they would be if pattern making were taught by rule.

IX. DRAWING FROM NATURE—PENCIL

Introduction.—The drawing of flowers offers excellent practice in pencil drawing, and tends to improve the line work by making it more refined When possible, specimens should be provided for each child in the class, and they should be simple in form The buttercup and the primrose are excellent examples of flowers suitable for pencil drawing, and a supply can usually be obtained in their season Where difficulty in supplying such specimens exists, a few larger flowers should be procured, such as the tulip, iris and Canterbury bell. These should be mounted in good positions against a background which will define their forms.

Exercise 1.—Distribute buttercups to the class giving each child two specimens, one of which will be used for plant analysis, and for drawing such details as the petals and calyx. Let the children pluck the petals and make a drawing of one, noticing the direction of the delicate ray lines. The stamens and sepals are clearly shown in the plucked flower. Before drawing them, note the relation between the stem and the ray lines of the stamens In the complete specimen observe that the petals enclose the stamens and hide most of them from view, but it is necessary to know how they grow from the top of the stem in order to reproduce correctly in the drawing what can be seen of them Impress upon the minds of the children that their drawing should be slightly larger than the specimen. The primrose, wild rose and other simple flowers should be drawn from a knowledge of the parts of the flower as well as from its general appearance, Figs 1, 2 and 3, Plate LXVII.

Exercise 2.—Large flowers used as specimens can be drawn only from their general

BUTTERCUP—PETAL AND CALYX

OUTLINE OF A DAFFODIL

appearance, unless the teacher illustrates a simple analysis of each by drawings on the blackboard The daffodil is an interesting flower to draw, as its axis is at an angle to its stem To this axis its main lines converge to form the curved surface of the ovary which leads to the stem. The children should notice that the perianth is cone-shaped, and the open end is contained in an ellipse. The coloured sepals—six in number—flow gracefully out of the base, their points also being contained in an ellipse. These observations should assist the children in making their drawing, Fig. 4.

Other flowers for careful observation and drawing are the tulip, each petal of which is much the shape of the flower as a whole, Fig. 5; the Canterbury bell, with its cylindrical shape, definite lines and characteristic calyx, Fig 6; the sweet pea which, in some positions, resembles a butterfly, Fig 7, and the clematis, with its simple lines and raylike stamens, Fig 8. These, and a host of similar floral subjects, provide the first requirements of the drawing lesson, viz., that the subject should be attractive and interesting The contemplation of such objects compels attention and keen observation.

X. DRAWING FROM MEMORY—PENCIL

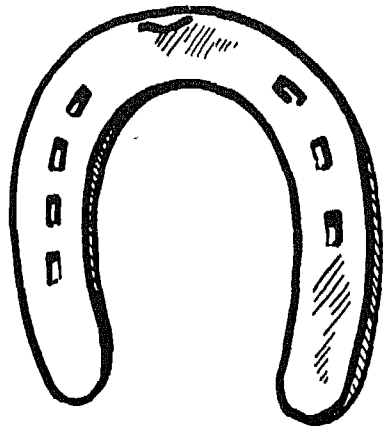
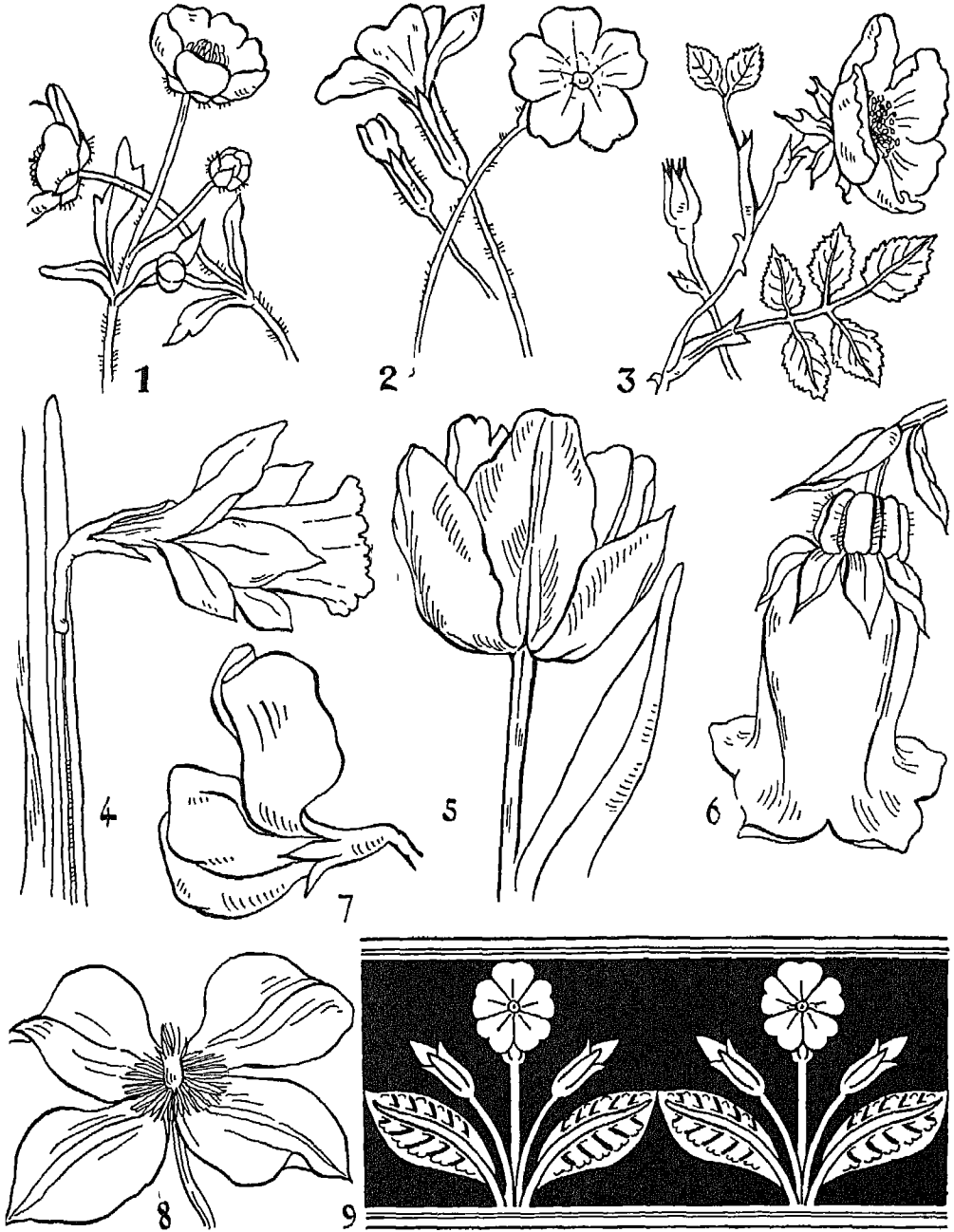
Exercise 1.—*Short observation.* Show the class a horseshoe and ask the children to look carefully at it; to think about the way in which it is made, and how it is fashioned to serve its purpose Three minutes should give ample time for these observations. Put the object out of sight, and let the children draw it as a memory exercise. In order that the perceptions can be fully expressed, the drawing should be almost to full scale. For the purpose of this lesson, a small drawing could only convey a general impression of shape, and it would not serve the purpose of the lesson. After the drawings have been made, the teacher should note both the general and the individual faults, and while these may be corrected from observation of the object in a future exercise, it would be of great advantage to the class if the children's observations were tabulated on the blackboard—

HORSESHOE

Plate LXVII

Drawing from Nature—Pencil

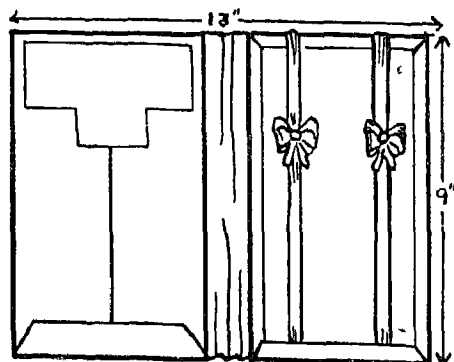
1 Buttercup 2 Primrose 3 Wild Rose 4 Daffodil. 5 Tulip
6 Canterbury Bell 7 Sweet Pea 8 Clematis 9 Primrose Pattern

the general shape of the horseshoe; the number and arrangement of the nail holes; the shape of the holes and what the shape suggests, the dent in the curve at the top and the hook at this point. (The inside of the shoe, on the right side of the drawing, is rather longer and not quite so thick as the outside) When all the points have been tabulated many children will be surprised to find that a good deal has been missed in their own drawing By co-operating with the teacher in tabulating the points to be observed, the children will be stimulated to make increased effort in their own observations, and their work will gradually become free from glaring faults.

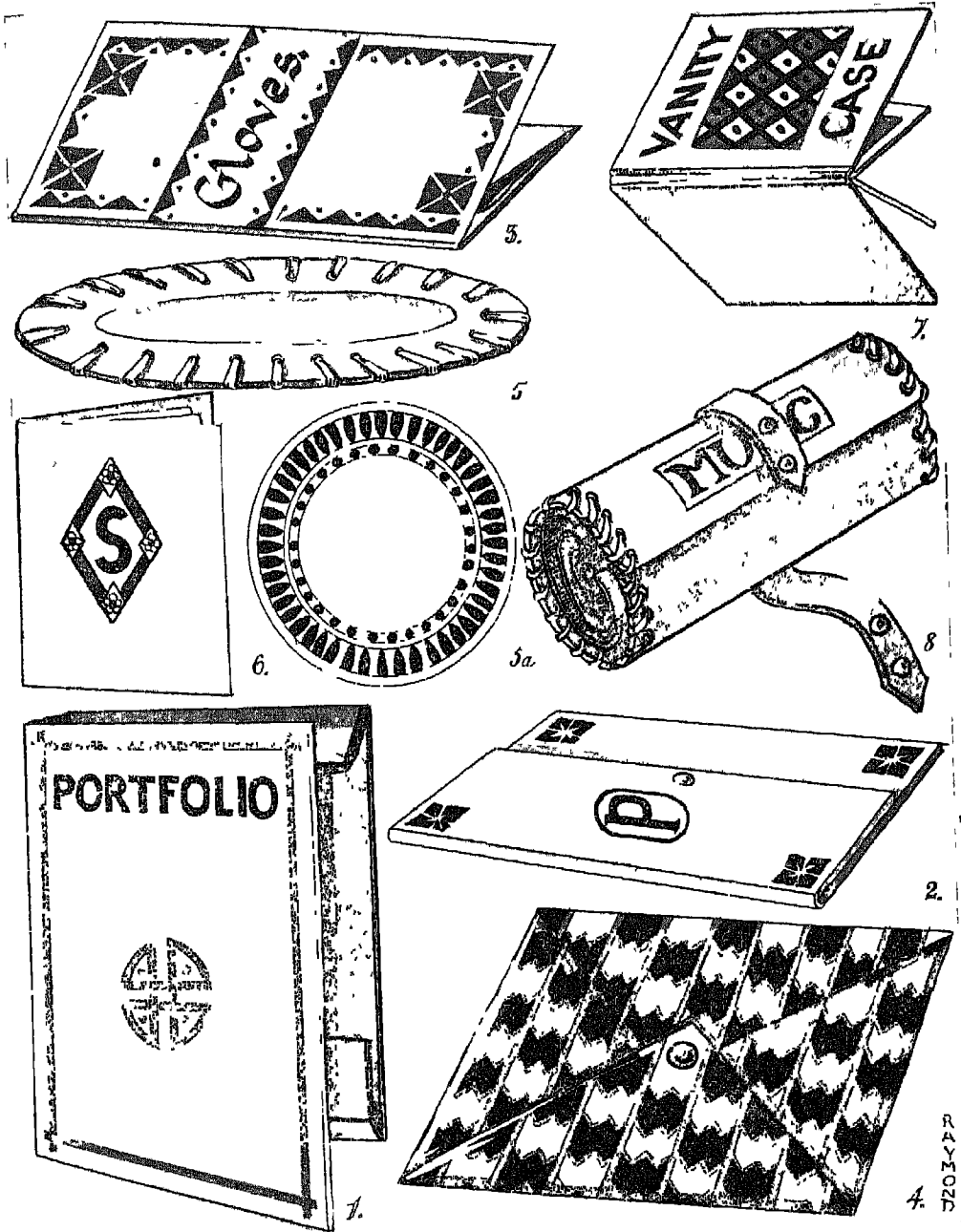
Exercise 2.—Show the class a pair of pincers and illustrate their purpose. Where it is convenient, the pincers should be examined individually, or by small groups of children The drawing to be made from memory should be of a good size, so that the observations of the children may be clearly set down. In this exercise it is not necessary that the children should attempt to indicate the thickness of the tool, a front view of it will be sufficient as a memory test.

Other objects suitable for exercises of a similar kind are a chopper, a small shovel, a bicycle bell, a pudding basin, a set square and a book.

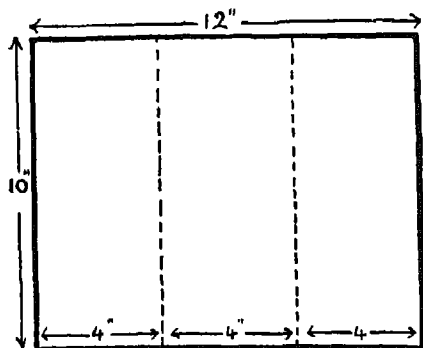
XI. HANDWORK—PORTFOLIOS AND HOLDERS

Exercise 1.—This exercise consists in the construction from flexible cardboard of a portfolio It forms a good preliminary exercise in the use on a large scale of bookbinders' cloth. The cardboard has an all-over size of 9 in by 13 in and is covered with a good tinted paper Greater care is needed in the covering of flexible cardboard

PLAN OF A PORTFOLIO IN FLEXIBLE CARDBOARD

than of rigid strawboard The inside of the covering surface should be pasted first, and the cardboard carefully placed upon it and pressed lightly down Arrange the cover exactly as when covering a book. Opportunity should now be taken to attach tapes at the top and bottom of the right half between the outer cover and the cardboard, these tapes should be secured by glue. They are intended to keep papers 6 in. by 8 in securely in position. On the left-hand side is fitted an envelope 6 in. by 8 in From previous instruction the children can make their own design of the envelope and fasten it down The decoration of the portfolio should be of a simple character and suggestive of pattern work on leather, Fig 1

On these lines various forms of portfolios can be devised with different schemes of decoration A greater variety of models and ideas will be secured if the class works in sections

HANDWORK—PORTFOLIOS AND HOLDERS

1 Decorated Portfolio 2 Holder for Table Napkin 3 Glove Holder
4 Holder for Doilies 5 and 5a Mats for a Teapot and Jug 6 Needle Case
7 Vanity Case 8 Music Holder

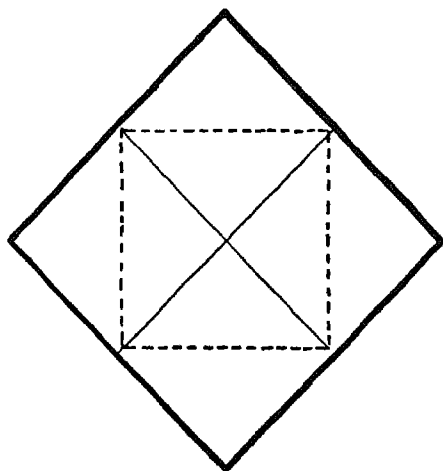
Exercise 2.—By similar methods the children can make fancy holders for gloves, handkerchiefs, doilies and table napkins. For the glove case flexible cardboard 12 in by 8 in is necessary. The covering in this case might be made of cretonne bound with a ribbon to match. This model could be made more attractive by adding a flap to the all-over size and securing it by a press button, Fig. 3 For table napkins, the all-over size is 12 in by 10 in. and the cardboard should be covered with cambric, satin or crash Folding is carried out as shown in the diagram, and press buttons are sewn on for fastening purposes The decoration might be done by simple embroidery or stencil, Fig. 2.

PLAN OF A HOLDER FOR A TABLE NAPKIN

A holder for doilies will require a sheet of flexible cardboard about 15 in square Join the centres of the sides, mark 1 in. inwards on these diameters and join the points to make a square within the square The lines of the inner square indicate the folding edges. From this stage, covering, fastening and decoration can be carried out by the children as in the previous exercises, Fig. 4

Additional exercises on the use of the materials suggested are mats for a teapot or a jug, a needle case, a vanity case, a holder for music, etc , Figs 5—8.

The importance of giving children the opportunity to make their own experiments cannot be over-estimated "During these years the child learns chiefly through his experience and experiments From his earliest years he has used his hands to explore the nature of his surroundings. By handling material things he discovers his powers over them, learning what he can and cannot do with them, and so lays the foundation for that knowledge of material which in later years becomes instinctive. It is the teacher's part to widen his experience of things by introducing him to fresh materials to make things which will give reality to his world of make-believe, and so long as the teacher does not interfere with his spontaneity, she can help him by suggesting better ways of carrying out his ideas, while, a little later, she can widen the scope of his experiments by suggesting new ideas of things which he can make

"In all constructive work the child should be free to choose the most suitable material. It is unwise, accordingly, to limit the freedom of choice by dividing handwork into specific branches which depend on the material used, such as paper folding, or clay modelling "

Handbook of Suggestions

PLAN OF A HOLDER FOR DOILIES

XII. IMAGINATIVE DRAWING—COLOUR

There is abundant scope for the exercise and expression of the imagination in the series of stories which form part of the mental furniture of every intelligent child Generally the title of the story is sufficient to suggest some vivid pictures The story of *Dick Whittington and his Cat* may recall pictures of Highgate Fields, the city merchant's house, the cat and the mill, the richly laden ship, etc. Each child could make for himself lists of pictures suggested by well-known stories.

For this exercise the teacher selects a story, and either reads an extract from it or relates the story in outline The following are two suitable examples of passages that might be read to the class·

(1) "Ali Baba came down from the tree, and made his way through the bushes till he came to the door, which they had concealed He went up to it, and called out 'Open Sesame', when the door instantly flew wide open."

(2) "He made signs to me to take him on my shoulders and cross the brook, making me understand that he wanted to gather

[Reproduced by courtesy of the Royal Drawing Society

SKIPPING LAMBS

"Snapshot Drawing" by M Forster-Knight

some fruit I supposed he wished me to render him this piece of service, so taking him on my back, I stemmed the stream "—*Sindbad the Sailor*

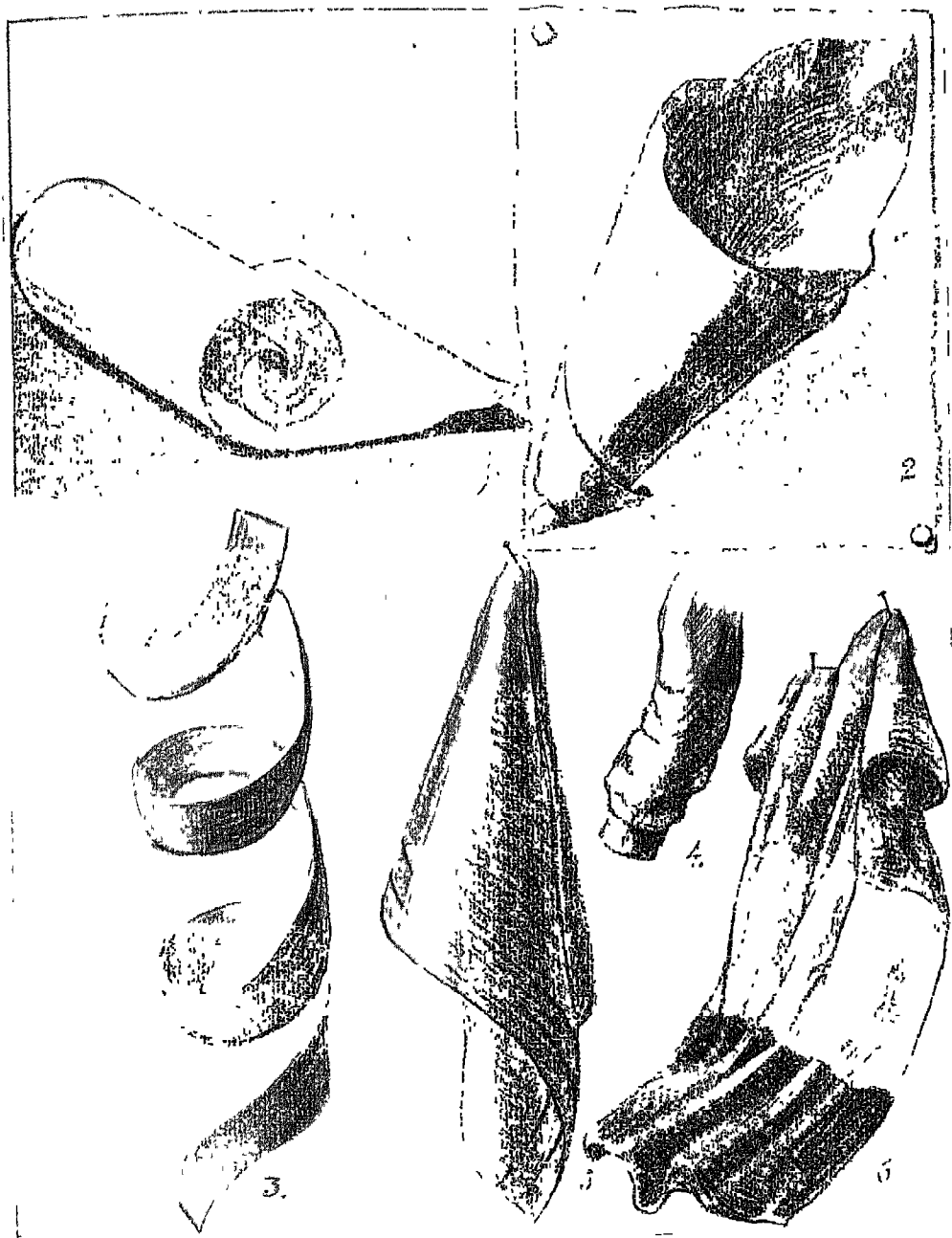
As in previous work of this character, the children should be encouraged to exercise their fancy and use their knowledge of pattern making in rendering flowers, trees, buildings, seascapes, etc The drawings may be done in pastel or water colour; the latter is the better medium for producing an effective colour scheme.

XIII. PASTEL DRAWING—SHADOWS

Introduction.—For the purpose of revising the main principles of work in colour carried out with pastel as a medium, a few exercises in scrolls and simple drapery will be valuable. Colour grading, blending, texture and easy shading are all involved in the practice supplied by such objects. Although the subject of shadows is too difficult for the children to consider seriously at this stage, it is necessary to give them encouragement to observe the shapes and colours of shadows, to perceive that shadows are not simply grey or black patches, but that they partake of the colour of the surface upon which they fall, and that they thus receive reflected tones from their surroundings This understanding of shadows should be attempted in order to encourage correct observation, and to supply a greater interest in colour work.

Exercise 1.—Set before the class a loose roll of pink blotting paper placed on a brown foreground. The general shape can be indicated by a light charcoal outline. By the same method that was used in the preparation of colour scales, prepare a suitable tint of crimson lake (cherry red), with white to give the main colour of the blotting paper Varying shades of red will express the lighting of the roll It is important to work in the foreground at the same time as the object, as by doing this the tone values can be more correctly stated If the brown of the coloured foreground is left till the object is complete a disappointing result will follow, as new values will naturally appear and will require expression. Let the children suggest the colour of the shadows: they will find that a mauve colour will probably represent shadows in the folds of the paper, and purple those in the foreground The teacher should take one well-drawn copy and let the children examine how the shadows have been produced Their training in colour selection should prove valuable for this new exercise in search of colour. Similar practice in depicting shadows can be made with coloured scrolls of tinted paper suspended against a background. Grocer's sugar bags are useful objects for exhibiting the colour effects in shadows, Figs. 1, 2 and 3.

Exercise 2.—Suspend a coloured fabric against a suitable background—a pale blue square of casement cloth against a drawing board, or an orange square against a green background. Let the children note the inverted V shape of the object, and that the folds arrange themselves about a vertical line or axis Tints and tones are clearly expressed on and between the folds, while soft shadows lie on the colours The drawing of these forms is a valuable exercise in colour selection and representation, Fig 5.

Other examples shown on the Plate are the sleeve of a girl's frock and a flag, Figs. 4 and 6.

PASTEL DRAWING—SHADOWS

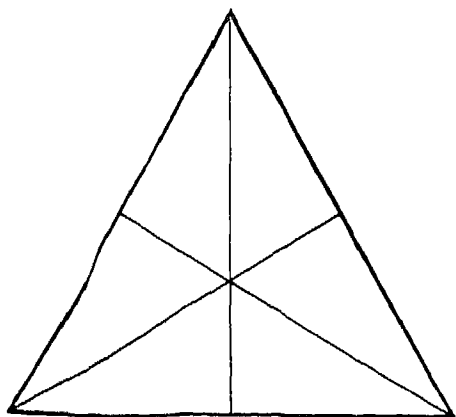
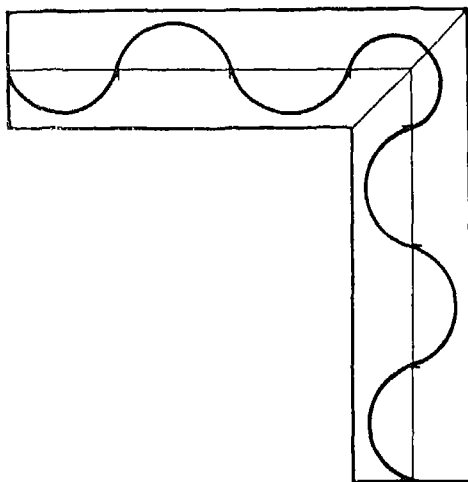
1 Roll of Pink Blotting Paper.
3 Strip of Paper
5 Square of Coloured Cloth
2 Grocer's Sugar Bag.
4. Sleeve of Girl's Frock.
6. Flag

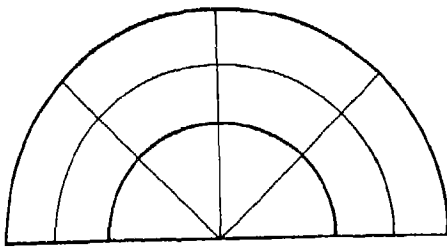
XIV. BRUSHWORK AND PATTERN MAKING

(Colour Plate No. 168 B in the portfolio)

Introduction.—Having now some knowledge of the application of pattern to leaf shapes, the children will find it a natural step to apply their sense of pattern to space filling Here they will be guided by their previous exercises on the simple use of ray lines as seen in natural forms, and by the fact that their best efforts in pattern work have been those in which the pattern shares equally with the background in the result. Generally, the pattern occupies about one half of the space to be filled

Exercise 1.—Show on the blackboard a few of the regular shapes such as the square, rectangle, equilateral triangle, circle, part circle and kite, from which the children will discover that the natural division by diagonals or ray lines from the centre supplies the common plan for space filling. Various exercises can be adapted to this purpose: the equilateral triangle will provide triangular-shaped and kite-shaped figures if lines are drawn from each corner to the middle of the line opposite to it All polygon shapes may be similarly divided The kite can be divided regularly by drawing diagonals A variation from the simple oblong or border shape can be supplied by joining a level border to an upright border and forming a bracket or corner shape. The children should suggest the best way to use this space for their pattern making Among other schemes they will probably arrive at the wave-line method by drawing a series of curves through points marked at regular intervals on a middle line drawn through the shape They will soon discover a method for turning the corner by the use of a leaf pattern or similar device, Fig I on the Colour Plate. The exercise afforded by this preliminary work will greatly assist the children when preparing border patterns for book covers, decorated cards and clothing.

Exercise 2.—The circle, which is capable of so many divisions by the use of ray lines (radii), provides good exercises for space

THE EQUILATERAL TRIANGLE DIVIDED INTO TRIANGULAR AND KITE-SHAPED FIGURES

THE WAVE LINE USED FOR FILLING A BRACKET SHAPE

filling· balanced spaces and centres of interest for pattern arrangement are quickly and easily supplied. Units of pattern can be made from coloured paper, and experiments of trial positions can be compared The units may take the form of leaves and flowers, Fig 2 on the Colour Plate The outlines of the units should be used to indicate the general scheme of the pattern, which can be developed and unified by a wave line or other connecting device The selection of a good colour scheme is essential

A Semicircle can be easily Divided into Shapes for Simple Pattern Work

The half circle, known as the half moon or lunette shape, can be used very effectively for pattern work. The children should not go beyond the shapes suggested, but there are great possibilities in the use of these and their simple combinations.

Fig 3 on the Colour Plate shows an effective use of the equilateral triangle with a pattern suggested by the repetition of the unit derived from the seed pod of the sycamore

In Fig 4 is shown the hexagonal shape with units in five of the six kite-shaped divisions

Fig 5 shows a rectangular shape pleasingly decorated with a honeysuckle *motif* which illustrates balance without actual symmetrical treatment Such an arrangement as this follows the teaching how to place sprays of foliage and flowers by the use of "finders," as recommended in the lessons on pencil drawing from nature.

XV. DRAWING FROM NATURE AND PATTERN MAKING—LEAF BUDS

Introduction.—The early springtime provides an excellent opportunity for the study of tree buds, and for their inclusion in the drawing lesson at a time when few other nature specimens are available Buds are valuable for the purpose of observation and drawing of natural forms, and can be used very effectively for the making of patterns Large buds, such as the chestnut, sycamore, hydrangea, rhododendron, plum and apple, are most suitable if taken early in the season Smaller forms such as lilac, ivy and oak make good pattern units when drawn to a large scale.

Exercise 1.—Provide the children with, or let them bring to school, one of the large buds suggested above. It is an advantage in this instance to have variety rather than uniformity, for then the difficulty of supplying a large number of buds of any one kind will be avoided, and each child will be enabled to study his own specimen as a unit. Emphasise the importance of placing the object in a good position; this may be found by turning it on its stem and viewing it against white paper The best view will probably be that in which the forks of the stem are seen making angles against the paper. Observation will disclose balance in parts of the stem, the forks, and the lines of the leaf folds on the bud. This feature of balance should be carefully expressed in the drawing. Starting from the bottom of the leaf bud draw the small scale which forms the centre, and then the balanced

lines which curve to the outline on each side Next draw the large centre scale from which the series is continued to end in the point of the bud, Figs. 1 to 6 The stem can be completed, as in previous exercises, by noting carefully those characteristic features which belong to each If the buds are preserved in water they will gradually sprout, and further lessons may be taken in order to make a record of their development It will be noted that the buds exhibit a beautiful symmetry of form which suggests new possibilities for pattern making, Figs 7 to 11

Exercise 2.—Remind the children of their drawings of leaf buds and let them explain the points which were noted in their observation. They can now plan a pattern based on a leaf bud. The space shapes formed by the scales will play a large part in the pattern, which can be rendered in coloured gummed paper cut-outs or with a flat wash of colour In later lessons this form may be applied to examples of stencilling Only the single bud should be attempted in this exercise, and the children should devise their pattern without any directions other than those of a general character required for the plan, Figs. 7 and 9

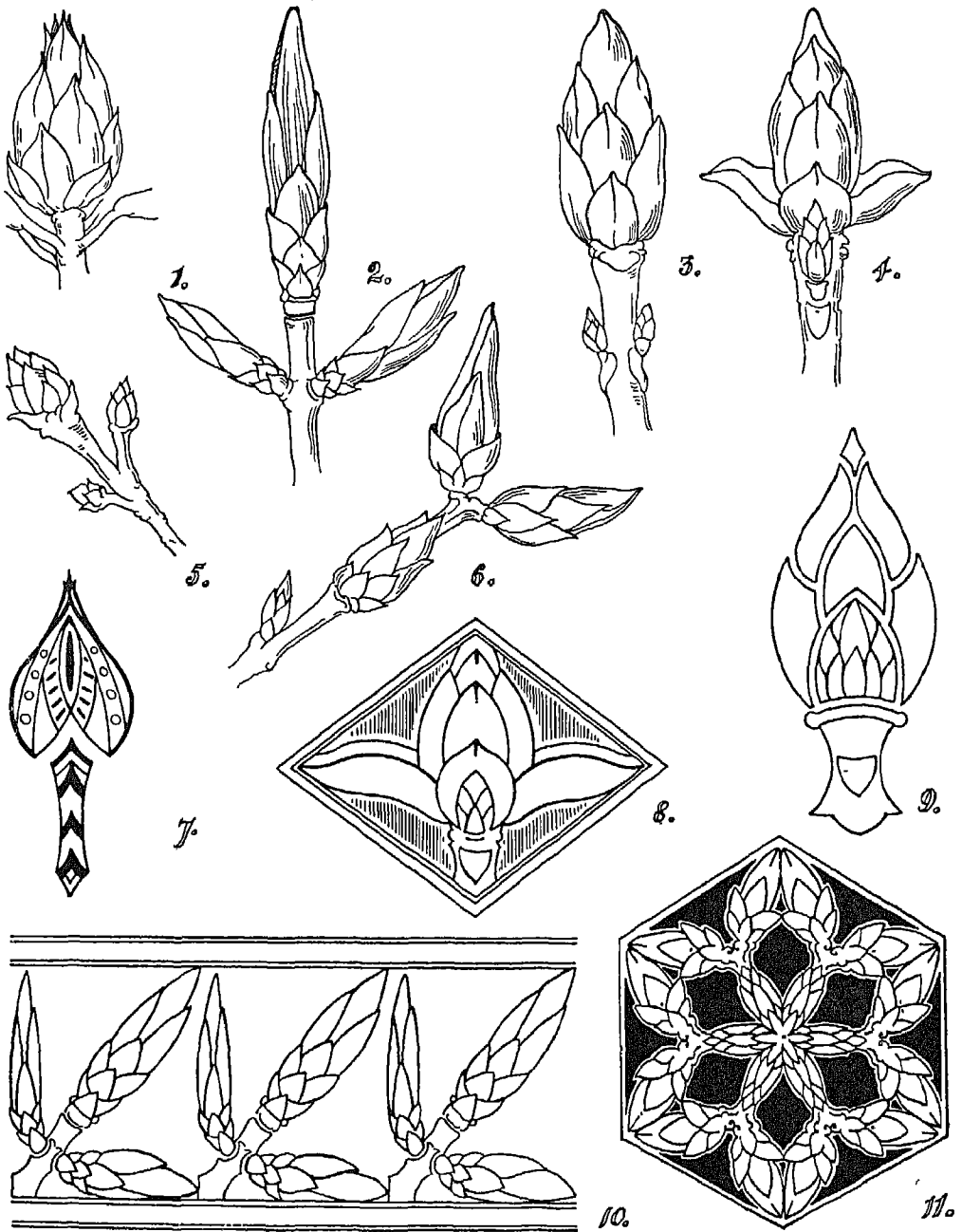
Examples of the development of the unit for the purpose of space filling are suggested in Figs. 8, 10 and 11 It will be noticed that kite-shaped sections provide a most suitable enclosure for the units Figs 10 and 11 are intended to illustrate what may be done by repeating a unit They should be used only as hints to children who feel that they would like to develop their pattern work on similar lines

XVI. DRAWING FROM MEMORY—COLOUR

Introduction.—As a variation from the methods hitherto adopted for purposes of memory drawing, it is suggested that a memory drawing should be taken in connection with the use of colour The drawing of objects from the sense of shape has been urged in this course Children's sense of shape is strongly stimulated through colour, and in visualising an object it is that colour shape which forms the image It is therefore likely that reproducing shapes in colour will truthfully register what was pictured in the mind The exercise may be done direct from the children's percept of the object chosen, such as a pillar box, or it may be done after short observation The former plan limits the choice and should be from the experience of the child rather than from that of the teacher. In the latter case, choice is so unlimited that the teacher must be careful to choose objects of good colour, reasonable shape, and free from perplexing details either of colour or construction. An example of each form of exercise with alternatives is here suggested

Exercise 1.—*Direct.* Distribute pastel papers and colours to each child and ask them to draw the representation of a loaf. This is an object of uniform colour, and the shape is well-known to the children The drawing should occupy at least one half of the paper, so giving opportunity for the full display of observation and colour sense.

Other objects suitable for exercises in direct memory drawing are a banana, half a Dutch cheese, a cricket bat, a Bovril bottle, a lemon and a sugar bag.

Exercise 2.—*From short observation.* Show for a few minutes a coloured saucepan, and encourage the children to study it as a colour shape The object having been withdrawn, the children will choose the coloured pastel

Drawing from Nature and Pattern Making—Leaf Buds

1 Rhododendron
5 Oak
2 Sycamore
6 Lilac
3 and 4 Chestnut
7, 8 and 9 Leaf Bud Patterns
10 and 11. Space Filling with Leaf Buds

which corresponds to the colour seen They will probably wish to represent the saucepan effectively by showing the colour of the inner lining The coloured drawings should be of medium size and drawn in any position selected by the children. When the drawings are completed, the object may be shown again for the children to compare its colour with their own memory selection Serious faults may be corrected by the use of a few shades and tints of coloured papers

Further examples for exercises of this kind may be selected from the following. a school bag, a toy balloon, a football, a cap, a vase, a coffee jug, a slipper, a tie, a belt, a hand bag and a book cover

XVII. HANDWORK—GREETING CARDS

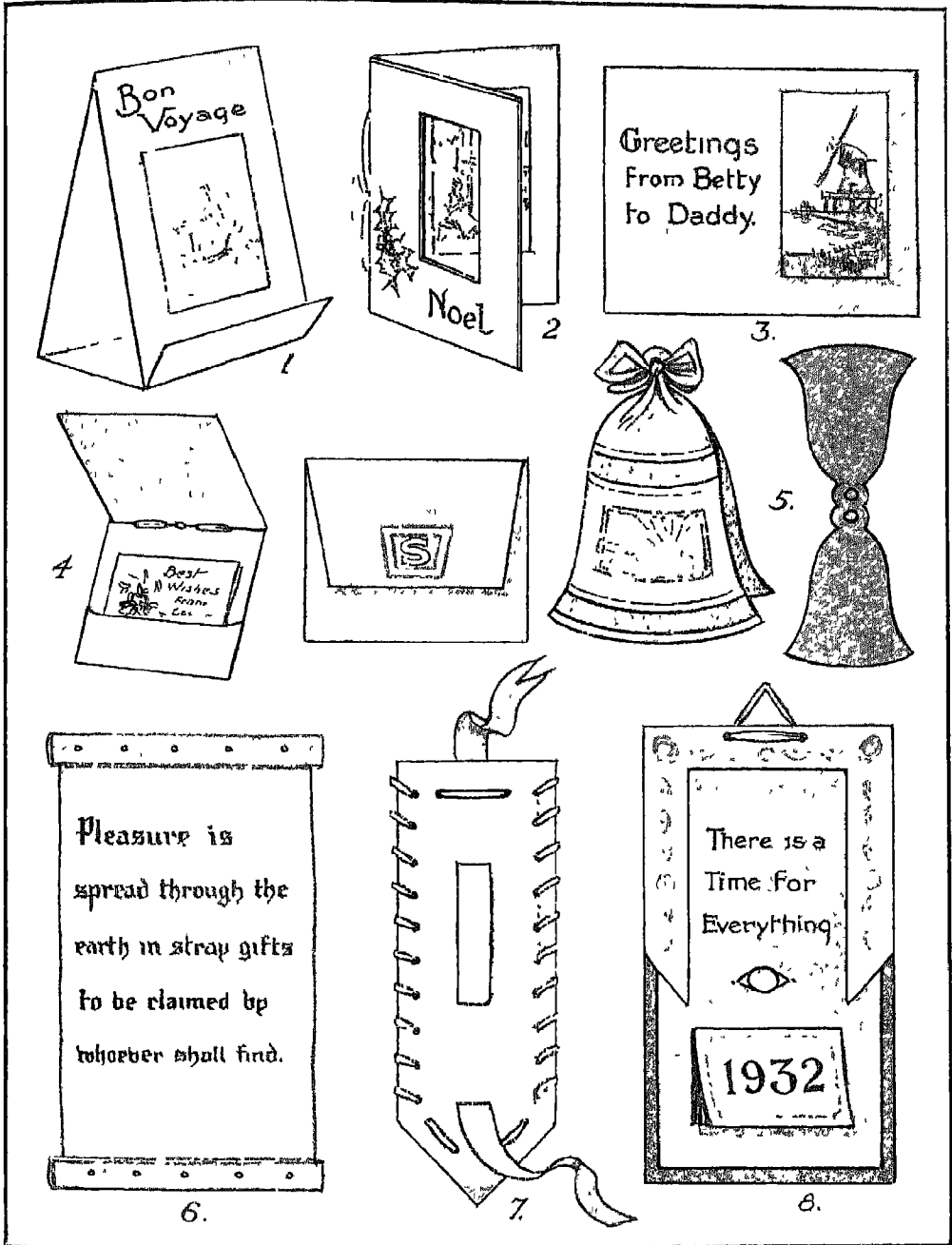
Introduction.—As the handwork is intended to be preparatory to a course of bookbinding, it is advisable to give the pupils plenty of opportunity to study the shapes of well-formed and beautiful lettering, and further to give them practice in producing it In the following exercises the children are required to make greeting cards, bookmarks, scrolls and calendars, all of which lend themselves to lettering and simple decoration

Exercise 1.—Supply the children with card of good surface from which they can make greeting cards Encourage them to devise original forms, using their training and past experience in the various operations of measuring, folding and cutting A simple greeting card which will stand is made by taking a long rectangular piece of card and folding it into two long equal sections, and two shorter unequal sections, Fig 1 By adding a picture and by using good lettering this becomes an attractive object

Another interesting form is made by placing a picture on the inside of a folded card; this is viewed through an oblong opening of similar shape cut through the left side of the folder. Slight decoration with lettering is added to the face of the card, and a cord or ribbon is inserted at the fold, Fig. 2. A simpler form is shown in Fig 3

The training that the children have had in making envelopes can be combined with the construction of greeting cards to provide a pleasing combination A long rectangle is divided into three parts, shaped and folded to form a simple but uncommon envelope in which is inserted a prettily designed greeting card, Fig 4 To make the bell-shaped card shown in Fig 5, fold a strip into halves, pencil on the face the outline of a bell including a ring for the handle, and cut out the back and front Decoration and lettering can be added as desired, a piece of ribbon tied through the ring has a pleasing effect

Exercise 2.—Children who exhibit keenness and ability should have the opportunity to use better material to enable them to produce more effective results Oiled paper which is used for lamp shades and stencilling purposes—and is quite cheap—can be supplied in strips for the purpose of making bookmarks The children can cut the paper to interesting shapes and decorate them with threaded raffia and ribbon Poster paint and Indian ink provide the best media for other forms of pattern and for lettering In a few cases the teacher may be able to supply parchment or hot-pressed paper for specimens of good lettering These might show some choice literary extract and be suitably mounted They are very effective when a lead strip border is added at the top and bottom, Fig 6. A decorated card bearing a calendar with appropriate lettering is shown in Fig 8

The foregoing examples should be prepared and worked as specimens, and each part of their construction should be finished with accuracy and neatness

HANDWORK—GREETING CARDS

1 2 and 3 Various Forms of Greeting Cards. 4 Envelope containing Greeting Card
5 Greeting Card in the Shape of a Bell 6 An Exercise in Lettering 7 Bookmark
8 Decorated Calendar

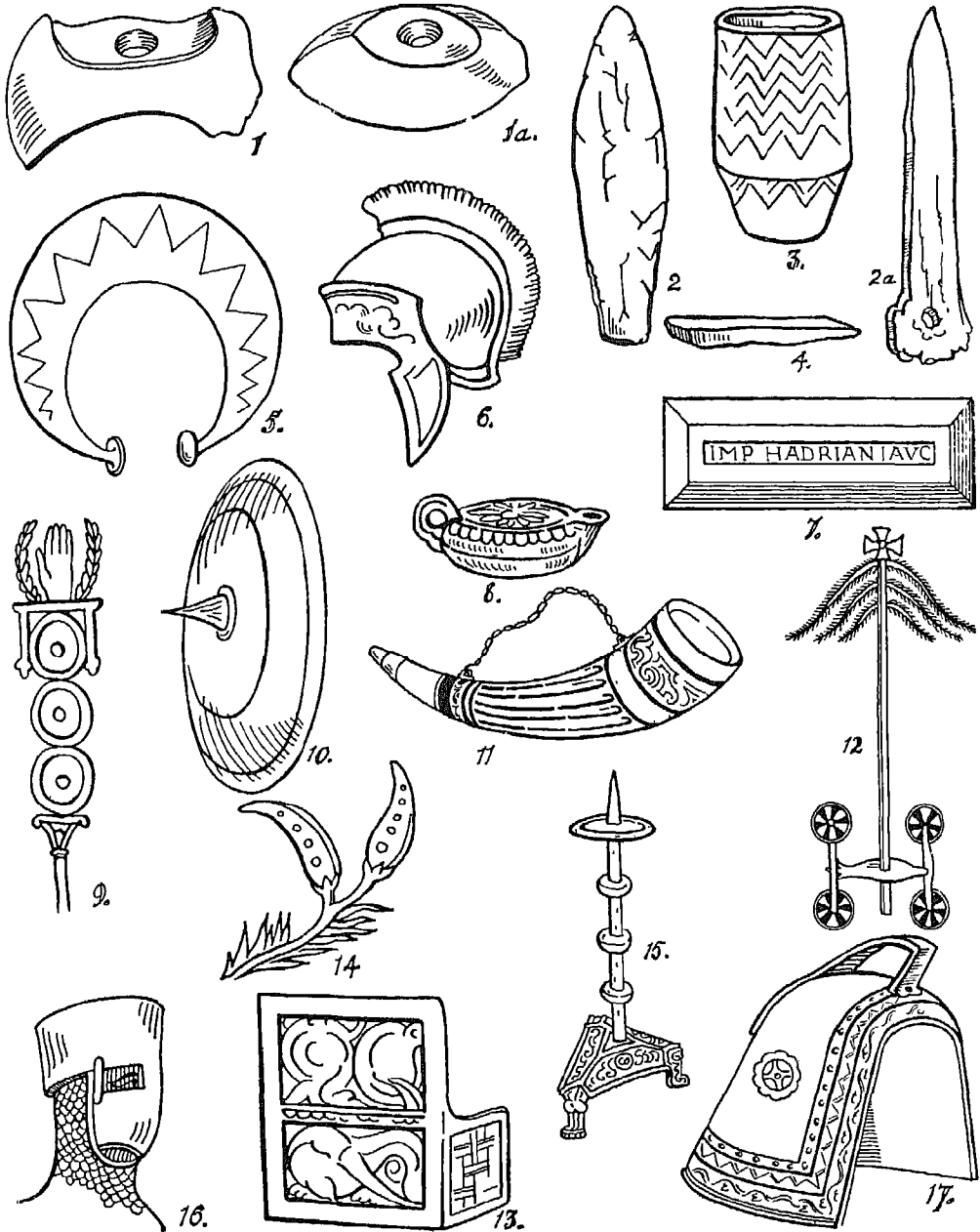
XVIII. ILLUSTRATIONS FOR THE HISTORY LESSONS

As a variation from the ordinary drawing lesson the children may be given an opportunity to make copies of drawings for use in their history notebooks It must be impressed upon the children's minds that the illustrations for history notebooks and time charts require to be accurate, or they are mostly worthless Children are apt to glance at illustrations in their history books without realising that many possess great value in expressing graphically some interesting development, process or craft which marks a definite stage in man's progress Children will readily co-operate in finding pictures, and a careful selection of them will provide ample material to cover any period under study As a rule, blackboard drawings or large illustrations prepared by the teacher must take the place of the objects. Sometimes, careful copies may be made from the illustrations in the history books, and occasionally visits may be made to local museums When taking a class to a museum it is of great importance to ensure that the children do not produce rough, disproportionate sketches of the objects selected for representation. Careful measurement and technical accuracy are absolutely necessary when drawing objects of historical note. To this end it is valuable for the children to have had some practice beforehand in preparing drawings from copies, and that under the careful supervision of the teacher

The teacher's illustrations should be drawn with a strong, simple outline on a large scale. Indian ink is, perhaps, the most useful medium for work of this character, and, with a little practice, the teacher will find that a small brush is the best instrument for producing bold, clear outlines It should be urged upon the children that they are not to alter their method of drawing—as many are apt to do when reproducing copies They should still look out for and represent the principal *shapes.* For instance, the *couvre-feu,* Fig 17 on the Plate, presents many difficulties when considered as a drawing in perspective, but a child who has learned to look for *shapes* will readily see that here he has two main shapes to consider (1) the open front, and (2) the cover Similarly the Saxon chair, Fig 13, can be rapidly sketched in two shapes (1) the end, and (2) the back

It will frequently be advisable to let the children make their copies by brushwork, for the brush is a capital tool with which to render the shapes of masses The stone axe heads, the helmets and the shield lend themselves to brush drawing In each of the first four volumes of this Encyclopaedia are many illustrations of historical subjects suitable for re-drawing by the children

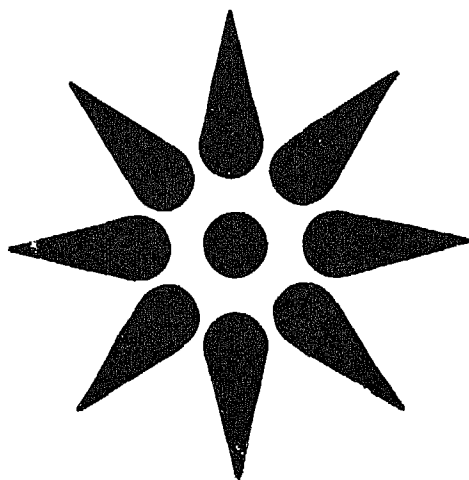
XIX. HANDWORK AND COLOUR—STENCILLING

Introduction.—Having made free use of cut-out shapes for decoration, the children will find the making and use of stencils a pleasing exercise In an early lesson—which is illustrated by Plate 162 c in the portfolio—open shapes were devised by paper folding and cutting; and, by the application of pastel colour through these openings on to

ILLUSTRATIONS FOR THE HISTORY LESSONS

1 Stone Axe 1a Hammer Head 2 and 2a Flint Spear Heads 3 Stone Drinking Vessel 4 Whetstone 5 Bronze Druidical Ornament 6. Roman Helmet 7 Ingot of Lead 8 Roman Lamp 9 Roman Standard 10 Saxon Shield 11 Saxon Hunting Horn 12 Norman Standard 13 Saxon Chair 14 Planta-genista 15 Candlestick 16 Norman Helmet 17 Couvre-feu

the paper, repeats were made for the purpose of making border and all-over patterns Stencils will be made on similar lines, and colour may be applied through the pattern openings for the decoration of various objects Children should first devise their own units of pattern, and should never be permitted to substitute the ready-made designs bought in shops

Exercise 1.—On a piece of firm paper let the children draw a simple shape which, when cut out, will leave an open pattern in the paper. This shaped hole is the stencil The drawings made at first should be quite simple in character, such as a small oblong, a large round or square spot, a leaf or fruit shape, or such units as those previously used in the coloured paper pattern exercises The shape, when made, has to be cut out of the paper, to do this cleanly so that the opening has a straight, even edge, it is necessary to make that part of the paper on which the drawing is made very firm and crisp: this can be done by painting decorators' knotting—which can be procured for a few pence—over the lines of the drawing When dry, this knotting will harden the paper and enable the pattern to be cut out cleanly, it will preserve the paper from the moisture of the paint and keep the stencil fit for use for a long time Oiled or stencilling paper is of course to be preferred to the use of knotting To make the pattern opening, place the paper on a hard surface, such as a piece of plate glass, and use a sharp pointed knife or a proper stencil knife held almost upright, cutting carefully round the pencilled lines remove the paper shape and the stencil or pattern opening will be seen This open shape will be placed down on the drawing book and the children can make repeat patterns by painting water colour in a semi-dry condition through the stencil and on to the paper It is necessary to warn the children to keep their stencil pressed down firmly while painting the pattern, and not to use their colour too wet or it will collect along the edges of the stencil and spread when the stencil is removed. The best results are obtained by the use of prepared stencil colour applied with stencil brushes in this case the brush is held upright and the colour dabbed or tapped on to the open pattern Such patterns and their simple combinations can be used in the same manner as those for stick printing to decorate cards, boxes, bags, belts, etc, Figs. 6 and 8

Exercise 2.—The children will now learn to make a stencil pattern which is formed by separated parts, that is, the paper between shapes which are cut out is left as a tie to prevent the stencil plate from falling apart This method is illustrated in the treatment of leaf and flower forms where the parts to be separated are sections between the veins of the leaf, or the distinctive shapes of the petals of the flower, Figs 2 and 2a It will be seen that in making a flower pattern, the petal shapes must be separated from the centre, and the stem from the flower, in a fret or basket pattern the cuts must be made between paper supports, Figs 4 and 5 This method adds to the interest of the pattern and the colour scheme, as the ties thus made form an interesting part of the design, Fig 1.

Stencil Cutting—A Daisy

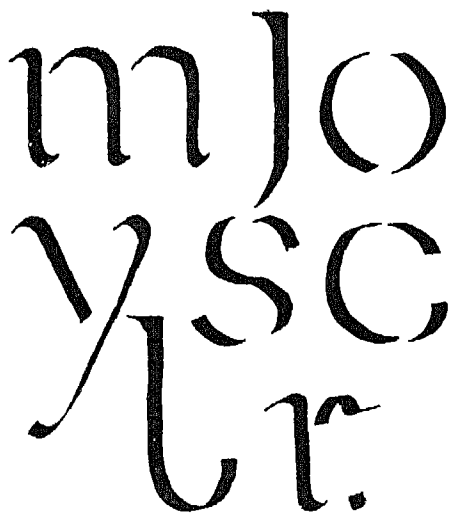
HANDWORK AND COLOUR—STENCILLING

1 Floral Pattern illustrating Decorative Effect of Ties 2 Leaf and Flower Stencil
2a Abstract Pattern 3 Butterfly and Snail 4 Stencilled Basket and Fruit
5 Border illustrating Ties 6 Stencil Plate with Pattern 7 Stencilled Material
8 Fret Pattern

A daisy offers a simple exercise for this purpose and may be represented as shown in the accompanying diagram. In order to obviate difficulties in cutting out, drawings should not be too small. With a little practice and experience in handling this kind of work, the children will quickly conceive the idea of making natural shapes into patterns for stencilling. Flowers and shells, animals and birds, baskets and fruits, and abstract shapes, Fig 2a, supply abundant material for stencil work; in further illustration of this, the snail and butterfly shown in Fig 3 are interesting examples

Art occupation.—Having acquired the art of making stencils, the children should apply stencilling to the decoration of their cardboard and paper models Girls can use stencils on various materials such as table centres, chair backs, piano covers, cushions, costumes for plays, etc , Fig 7 It is possible, by the careful manipulation of the stencil brush, to arrange the most interesting colour schemes a separate brush should be used for each colour, so that the scheme can be easily and quickly varied Boys can apply their stencilling to wood, using stains or oil colours, after the surface has been prepared with paint or size

XX. LETTERING

Introduction.—Instruction on lettering must necessarily be kept to the simplest terms, and should chiefly aim at securing neatness and accuracy of shape The upright character of the letters and their conformity to the square shape in general spacing must form the basis of much practice, which is essential to the production of good lettering. The wire forms introduced in previous exercises should be thoroughly mastered by their application to words written both in capitals and in script letters. Lettering with a chisel-pointed carpenter's pencil, a steel slant-pen, a quill or a reed pen, should proceed on the stroke method, each letter being studied by its stroke construction and rendered only in that form The accompanying diagram indicates a few characteristic strokes and their use in the formation of letters with the slant-pen It is necessary to point out that the pen should be held almost at right angles to the writing surface for this reason it may be advisable, where adjustable art desks are not in use, to tilt the surface by means of millboards resting on books

CHARACTERISTIC STROKES MADE WITH A SLANT-PEN

Exercise.—Let the children rule two lines $\frac{3}{4}$ in apart, and, from an example executed on the blackboard or from the alphabet taken in a previous lesson, let them print in wire capitals some descriptive title, such as the name of the school, a street or a

WESTMINSTER ABBEY

WESTMINSTER ABBEY

open unto the fields and to the sky

open unto the fields and to the sky

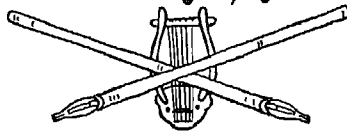
1.

Henry of Navarre. Suez Canal.

2.

3.

"Piper, sit thee down and write
In a book that all may read":
So he vanish'd from my sight:
And I pluck'd a hollow reed,

And I made a rural pen
And I stain'd the water clear
And I wrote my happy songs
Every child may joy to hear.

LETTERING

1. Wire and Slant-Pen Capital Letters 2 Wire and Slant-Pen Writing
3 Literary Extract written with a Slant-Pen

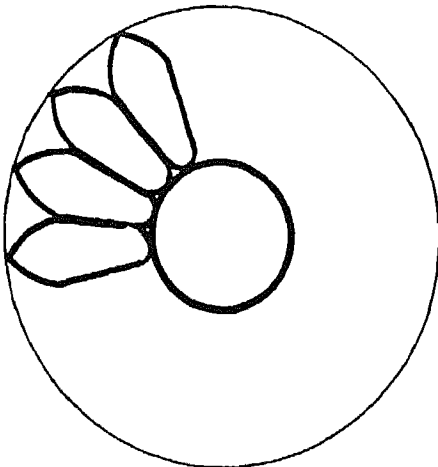
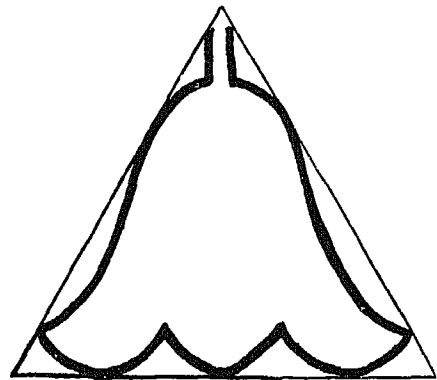
building Where satisfactory shape and spacing have been effected, another line of the same description may be attempted in lettering with the slant-pen This may be done either with shapes of wire letters to serve as a guide, or may be carried out directly, Fig 1

In connection with the same exercise small text should be done first in simple line letters and afterwards with the slant-pen. The exercise can be completed by combining both forms to print historical or geographical terms, simple headings for programmes or tickets, or short notices, Fig 2. It is well to let capable children print specimen examples of literary extracts in Indian ink on good paper, for by so doing they will be encouraged to produce the best work in their art occupation, Fig 3.

XXI. BRUSHWORK AND PATTERN MAKING

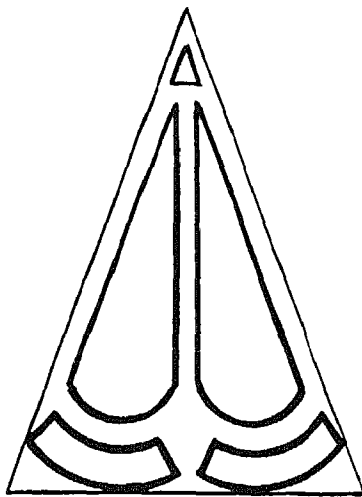
(Colour Plate No 168 A in the portfolio)

Introduction.—Drawing from nature has supplied the children with the idea of adapting their leaf and flower shapes to pattern work, and in this lesson it will be shown that flower patterns, used in connection with colour, supply *motifs* which can be used to make beautiful colour schemes

Exercise.—Let the children bring a flower which they think would lend itself to the making of a pattern It is more useful to let the children bring their own flowers than to supply specimens of the same flower to each child, for, in addition to getting a variety of interest, the children will have already considered pattern making during their search. Bearing in mind the instruction previously received, the children will investigate their specimen The extent to which their observation is exercised will mainly decide the originality of the pattern. Their discoveries can be sketched down as they proceed in their investigation this will greatly assist in deciding the plan for the pattern Suppose the flower selected is one of the daisy family The general shape of

Preparing a Pattern Based on a Flower of the Daisy Family

The Harebell has the General Shape of a Triangle

the flower is circular, hence the children will draw a ring Its petals are in the form of ray lines from the centre, and at the centre is a small disk of colour. Here then is the general plan. There is a starlike pattern made by the openings between the petals at the centre, and a pattern is shown by the ends of the petals which form the large circle Each of these features supplied by the flower may become part of the pattern. Having planned the pattern, it can now be decorated Again look for marked features The centre suggests a spot design there is a ring of colour formed by the tinted ends of the petals near the centre: there are dainty lines along the petal Each of these features can be part of a colour pattern, Figs 1, 1a and 1b on the Colour Plate

Another flower (harebell, convolvulus, hyacinth) has the general shape of a triangle, and its features suggest quite a different pattern The children can make experiments and, having found a pattern that pleases them, repeat it by the use of tracing paper Their training in the arrangement of cut-outs will greatly assist them in this work Having drawn the pattern, they will cover the whole with a suitable wash for a background, and then carry out their colour scheme Two other colours besides the background may be used, and these should not be those of the flower The aim is to use the beautiful shapes supplied by nature to assist the children in making and appreciating pattern in line and in colour

The illustrations on the Colour Plate are intended to suggest some applications of colour to patterns made from flower forms, but the children should build up their own schemes from the parts of the flowers which they have selected.

PREPARING A PATTERN BASED ON A BELL FLOWER

XXII. CARPENTERS' TOOLS—PENCIL

Introduction.—Few objects can be chosen for the drawing lesson which exceed in interest a set of carpenters' tools Boys will soon be handling them as implements for handicraft, and a knowledge of their form and the principles of their construction will be readily appreciated because of the careful observation required in drawing them

Exercise 1.—Show the class a pair of pincers, discuss and illustrate their use. If a pair can be handed round for personal inspection, the short observation will prove a valuable aid to correct perception The pincers should be placed against a white background fastened to the blackboard, where the tool can be seen in strong relief. It will be observed that the main lines are balanced about an axis, and that the proportion of the jaws to the handle can be gauged by noticing the position of the rivet. Upon the leading lines shown in the sketch, the

1
5.
6.
7.

HANDWORK SIMPLE BINDING

1 Example of Backing and Sewing
3 and 3a Paste and Paint Decoration
5 Single Overhand and Slip Knots

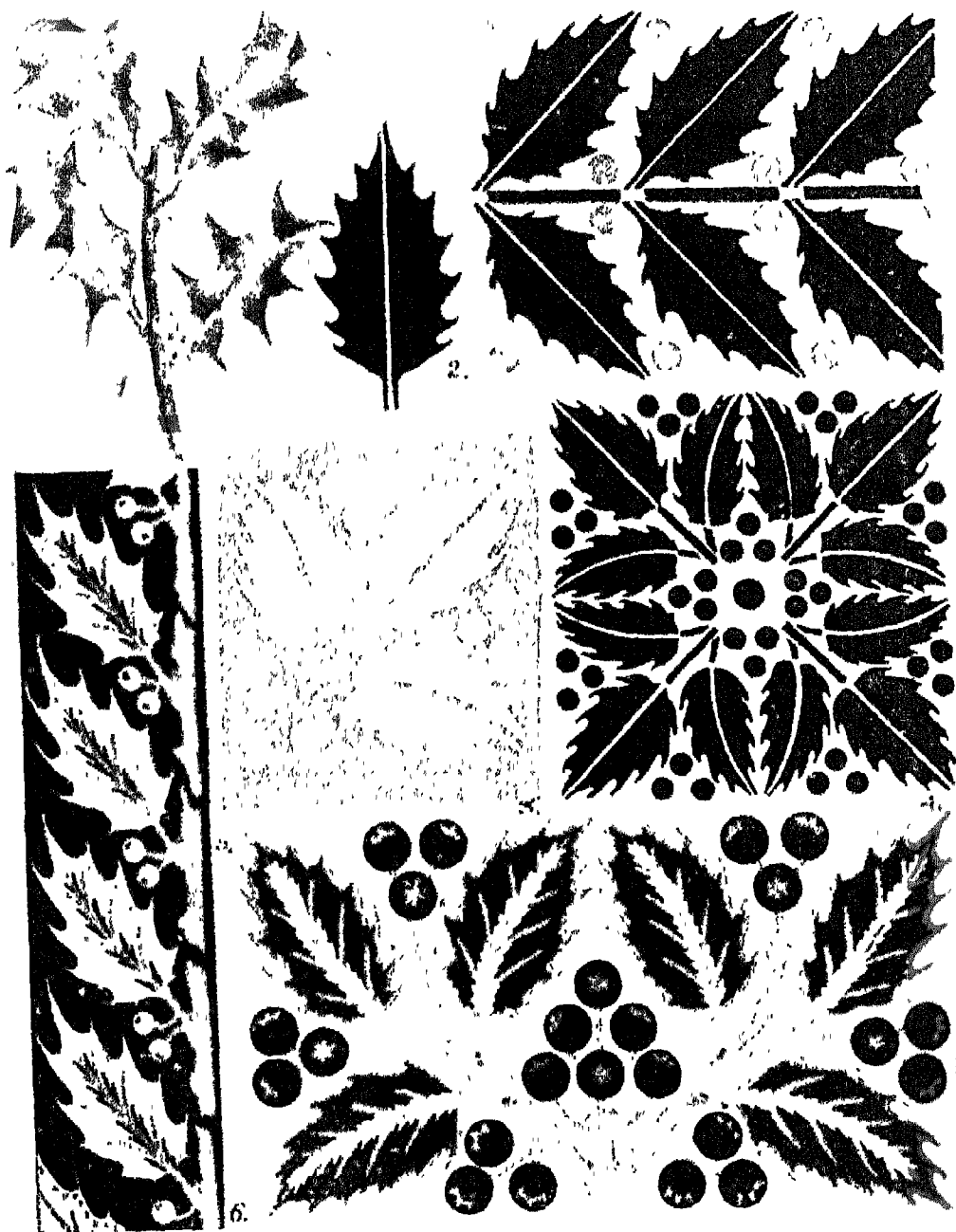
2. Decorated Cover.
4 Square Knot
6 Bow Knot with Applications

for the cover. these should have a border, and a dividing space between them so that when the whole paper is folded in halves, the panels will exactly coincide, Fig. 3. Having prepared the paper in this way, apply the colours as described and fold the paper in halves; draw the right half carefully away from the left half and a pattern similar in every respect will appear on each side. When dry, the pattern can be made more attractive and permanent by applying polish or clear varnish. Cut the pattern out of the borders and attach it to the covers of the book, Fig. 3a.

Exercise 2.—At this stage valuable instruction may be given on the tying of knots which are required in bookbinding. In Fig. 4 two knots are shown—the Single Overhand Knot required for securing a thread about a pin or nail, and the Square or Reef Knot used for joining threads when sewing the sections of a book. The former is made by passing the thread loosely round the pin in a clockwise direction for one complete turn, and then passing the loose end over the loop formed, and up through it again. The Reef Knot is formed from the ends of two threads, one held in each hand. Pass the right thread over the left and under it, so that it now lies toward the thread in the left hand; then [illegible] the [illegible], [illegible] this time taking the left hand thread over the right. The Single Overhand or Slip Knot is required in sewing sections when it is necessary to have the knot come between two bands, cords, or tapes, or [illegible] so that it will not be necessary to pull it through the [illegible] in taking the next stitch. Using a piece of string the Slip Knot is made by making a loop, and retaining a fairly long loose end, pass the end once about the neck of the loop to form a ring about it, then pass the loose end down through the ring. For binding the attachment to the old thread is made by the Overhand Knot already described at the beginning of the [illegible], Fig. 4. The Bow Knot is commonly used in tying shoes, parcels, bundles, etc. It can be made into a Double Bow Knot by tying the loops [illegible]. These knots are used for lacing and tying [illegible], and may be used decoratively, Fig. 6. The Plate indicates the use of these knots and their modification in [illegible], putting on ties, or tying up parcels.

XXIV. DRAWING FROM NATURE PENCIL AND COLOUR

Exercise 1.—Among the evergreens, which give the only available supply of leaf forms during the winter months, holly is the most attractive. The bright colour of its berries, the unusual shape of the leaves, and the associations of the plant with the Christmas season, all give an added interest to the drawing lesson.

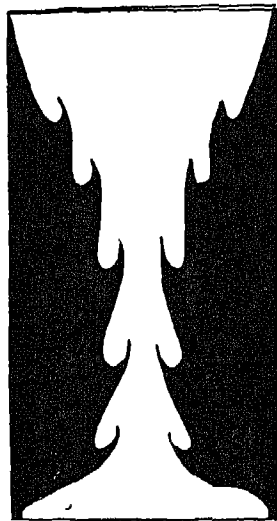
Supply each child with a spray of three or four leaves and, if possible, a few berries. The spray should be placed on a foreground of white paper, or on the opposite page of the drawing book. Encourage the children to make a careful examination of the spray and to note any differences as to the usual leaf forms. The following points should be noticed: the texture or surface of the leaves is smooth and glossy, the leaf is crisp and hard; its edges form a series of sharp spear points connected by curves; the leaves cluster closely about the stem; the berries cluster just below the leaf mass; the stem is rough and harsh. Such observations will not apply to each spray, but

DRAWING FROM NATURE PENCIL AND COLOUR

1. Spray of Holly.
2. Cut out with Application
3. Stencil Pattern
4. Application of Stencil to Repeats
5. Units placed in Border
6. Space Filling of a Rectangle.

they are generally characteristic of the plant. In order to draw the spray effectively the children should plan it on a larger scale than their specimen. This precaution is necessary, or the drawings will be small and without character. Most children show faulty perception by drawing specimens too small, an error which must be counteracted by requiring the first plan to be on a good scale. It is quite usual for children to represent a leaf which is 3 in long by a drawing only 1½ in long The first planning of the spray should begin with the stem and the midribs. Upon this framework the leaf forms can be drawn in position The prickles of the leaves are so dominant a feature that children generally represent them both out of proportion and in large numbers, in order to correct this tendency the children should count the number of prickles on their specimen Unlike that of most leaves, the line forming the leaf edge is strong and vigorous and should be drawn with clear, definite curves These curves form shapes which can easily be read and put down. The placing of the curves will lead naturally to the shaping of the spear points The coarse stem should be completed and the berries then added The latter must be carefully drawn while noticing the position of the short stem which forms the axis of each berry and indicates the correct position of the dark spot which shows the remains of the calyx The size of the berries may be compared with the width of the stem.

Exercise 2.—Recall the main features of the holly and ask the children to use these as units for a pattern to be worked in coloured paper. Leaf shapes can be made by folding and cutting, and the shapes for berries may be marked out round the end of a lead pencil These paper shapes can be combined to make a pretty pattern when placed on tinted paper, Fig. 2.

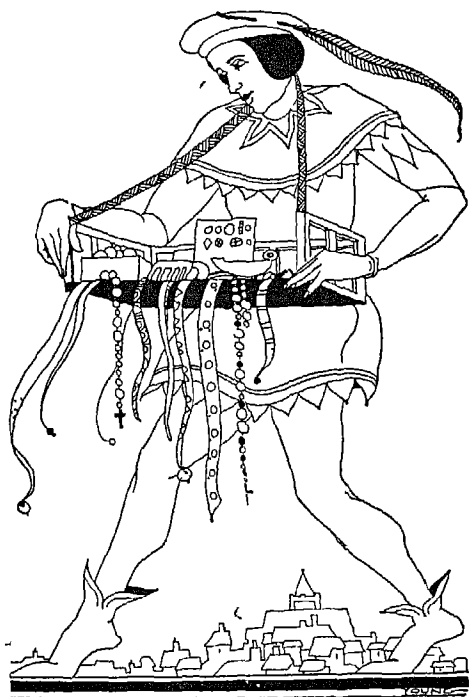
An alternative application is that of stencilling The divided leaf shape will make clean cut-outs, while the berries lend themselves to an arrangement of a spot pattern The stencil can be painted or rendered in pastel, Fig 3 (Stencilling is described in Lesson XIX.)

Exercise 3.—Either or both of the occupations described above will prepare the children for an exercise on pattern making to be carried out in brush work, Figs. 5 and 6 Having had previous practice, the children can prepare a pencilled scheme of pattern and select a pleasing colour scheme Natural colours need not be used, for just as they have departed from the actual form of nature in drawing, so they will find great possibilities in choosing for their pattern colours which are not seen in nature The creative faculties of the children will be exercised and stimulated by such an occupation. Figs 4 and 5 on the Plate illustrate patterns built up from simple units repeated to form a border and to fill a square. Fig 6 gives an example of space-filling for a rectangle

PAPER CUT-OUTS OF A HOLLY LEAF

XXV. IMAGINATIVE DRAWING

For the purpose of this exercise it will be interesting to recall some of those familiar figures which hold a peculiar fascination for children, so that pictures and poems about them possess much interest and charm The subtle suggestion of comfort and warmth brought through the dusky gloom of November afternoons by the Muffin-Man and his Bell, the sense of romance attaching to the Lamplighter lighting up a dark world, the pathos of the Blind Man and his trusty friend, the Sandman putting tired eyes to sleep, and the whimsical Pedlar, with his collection of magical wares, are all impressions which captivate the fancy of children and suggest characters which form excellent material for imaginative drawing.

Write the first stanza of *The Muffin-Man* (Volume II, page 209) on the blackboard and read the poem to the children This will arouse interest and create a mental image which the children will be eager to express in drawing The children should have no assistance, either by picture or suggestion, but should express their imagination of the subject in their own way, thus an educational result will be secured and some children may show a good deal of executive skill, but the latter is less important than the educational training derived from the exercise

The medium used for the drawing should be varied. On some occasions the pencil might be selected for the work, on other

THE PEDLAR

THE SANDMAN

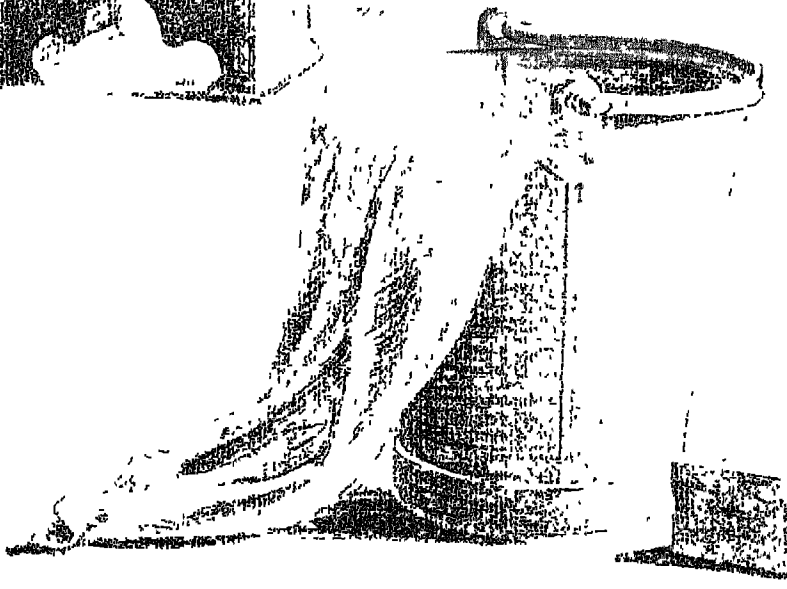
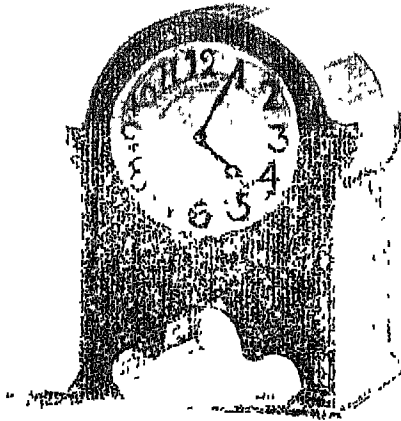
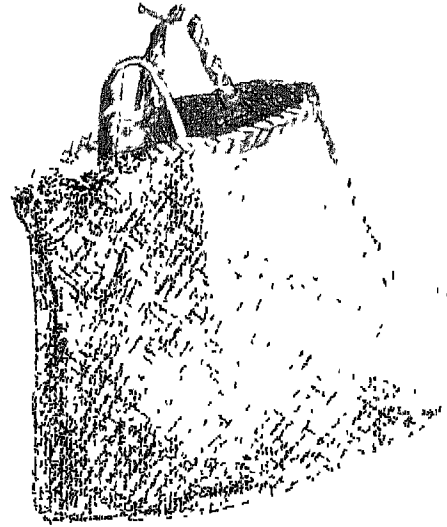
occasions the brush or pastels Care must be taken in exercises of this character to prevent children from copying the figures or pictures of their classmates This to a large extent can be obviated by giving the children time to think out their plan of work before being asked to begin the drawing Make quite sure that every child in the class has definitely decided what he is going to do. There are many poems in the first four volumes of this Encyclopaedia which lend themselves to imaginative drawing of the character suggested Exercises of this kind react favourably upon the attitude of children towards poetry. Sometimes they may be asked to select a poem or a part of a poem which they would like to illustrate, but care must be taken that they do not get their ideas from some illustration which they have seen, or the value of the exercise will be negatived Great interest and much educational profit will be gained when the children can memorise and visualise their poetical extracts in terms of illustration

XXVI. PASTEL DRAWING

Introduction.—It will be valuable at this stage for the teacher to consider the uses which pastel drawing has served throughout the course, and to summarise these uses in a few exercises In the early stages pastel was primarily used as a simple and attractive means of expression; it was found to be easy of manipulation, rapid and convenient; it introduced a good method of colour representation and taught the colour "sense", shapes were studied and definitely presented in colour; principles of colour mixing were expressed and applied, and the whole process formed a natural preparation for the use of water colour; by the methods adopted the difficulties of perspective representation in object drawing were largely removed To this extent, the teaching of drawing by means of pastel is justified where the teacher is satisfied that these results of its use have been accomplished Its frequent practice has not been considered necessary in the latter part of the course, as other media have been gradually brought into use. The exercises which follow may therefore be regarded as an illustrative summary.

Exercise 1.—Hang a small Union Jack before the class, thus presenting a flat colour scheme. The colours are easily selected, but the exercise demands close observation and extreme cleanliness in work, for its proper execution It is an exercise of great interest and attraction to children and, while presenting no technical difficulties of form, it will require and should exhibit good line work and careful grading of colour.

Exercise 2.—Suspend a coloured satchel or shopping bag before the class This will present a simple outline shape, but such special points of interest as the flap, the handles and the texture will require careful management The general shape will be indicated lightly in charcoal and the characteristic colour applied. Upon this the representation of texture and general effect of lighting can be done. This exercise will revise instruction of an earlier stage but should exhibit a better standard of representation.

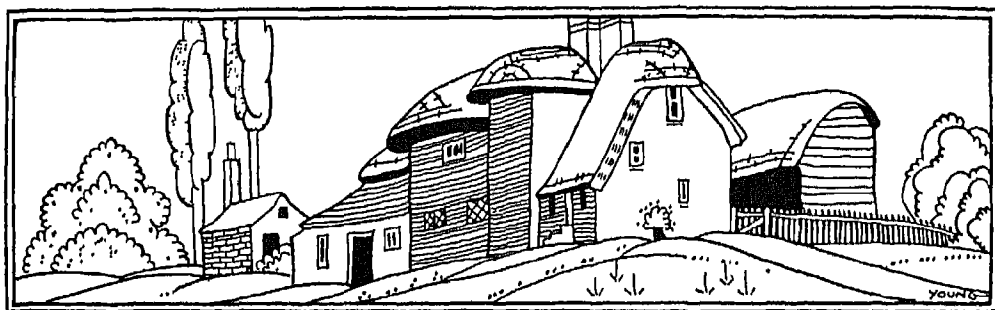
Exercise 3.—The drawing in pastel of single objects involving length, breadth and thickness can well be revised by drawing a box-shaped clock standing on the foreground and slightly turned to the coloured background This will exercise the ability of the children to perceive correctly the

PASTEL DRAWING

1 Union Jack.
2. Shopping Bag.
3. Clock
4. Pail, Cloth and Soap.

shapes cut out of the foreground and background, and in doing so to express the perspective view which is presented by the object. The effect of lighting on the colour scheme will provide excellent practice in the production of tints and tones and simple shadows.

Exercise 4.—A pail with a cloth hanging over its edge, and a large piece of coloured soap lying on the foreground compose a group in which variety of exercise is presented. Structure, proportion and placing are involved: in addition there is a simple drapery and the general colour scheme. This group is suggested in order that the teacher may judge to what extent the principles of pastel drawing have been acquired by the methods adopted in the former lessons.

XXVII. HANDWORK AND PATTERN

(Colour Plate 168 C in the portfolio.)

Introduction.—The teaching of shapes and their use in making colour patterns will have the effect of cultivating the children's sense of pattern and colour. They will begin to realise that not only leaves and flowers, but groups of leaves and flowers, shells and stones, insects and birds, animals of every kind, and even bushes and trees can be made into patterns. The sources are inexhaustible The ability of young children to respond to such training has been amply proved by Professor Cisek and others, and this outlet for children's imagination and inventiveness in decoration should not be ignored because its possibilities have not hitherto been generally explored

Exercise 1.—The teacher will refer to the earlier lesson on shell forms (page 158) and draw attention to the main lines of construction of the scallop, limpet or whelk. If possible, exhibit the shells themselves and ask the children to draw their general shape and characteristic lines. These outlines will form the plan upon which the children can devise a pattern for a colour scheme, Figs. 1a, 1b, 1c and 1d on the Colour Plate.

Exercise 2.—Most children can draw the outline of a rabbit, bird, fish, fowl or duck. Let them select one of these creatures for their drawing. Each of them supplies features of texture, colour and line which the children can adapt for their pattern scheme The pupils must clearly understand that they are to make a pattern of the chosen creature's shape, Figs. 2a, 2b and 2c.

Exercise 3.—Apply the same method to the butterfly or moth shape This form is full of suggestive ideas for pattern grouping. The children will have seen the butterflies hovering about the garden in groups which suggest formation or pattern Having devised a single *motif*, this can be repeated in a group based upon the triangle, pentagon or other shape Thus a pleasant but common sight in the garden will take on a new significance, and children will gradually acquire facility in pattern finding and decoration, Fig. 3 (Let the children study the Colour Plates in the portfolio)

XXVIII.
HANDWORK—SIMPLE BINDING, ETC.

Introduction.—In Lesson XXIII. a method of binding an old exercise book of single sections was introduced. The binding of books containing separate sections of leaves may now be carried out. Each child will require four sheets of paper 11 in. by 15 in., a strip of book muslin and a sheet of tinted paper to form a cover.

Exercise 1.—Each sheet of paper is folded carefully to form four pages. To do this place each sheet in turn with the wider side horizontal and fold it accurately, first from left to right, and then from bottom to top. The edges must be made to meet and fit exactly. Make two sections each containing eight leaves by placing one of the folded sheets inside another The two sections are now to be sewn together along their back edges Open each of the sections of eight leaves at the middle, and pierce holes with a sharp bodkin through the centre and at even distances from the top and bottom. The sections are shown diagrammatically lying side by side in the sketch. Begin the sewing from the inside of the right section at 1 and outside to 4 in the left section; then pass the thread inside at 5 and out at 2, now inside at 3 and out at 6 For the purpose of tying the threads pass the needle inside at 5, outside at 2 and tie to the end which remains through 1. All threads must be made taut in order to bring the sections neatly and securely together.

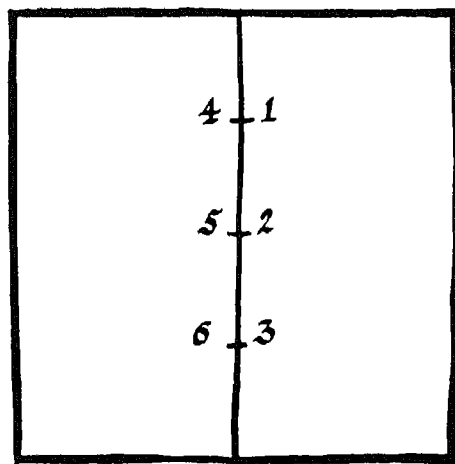
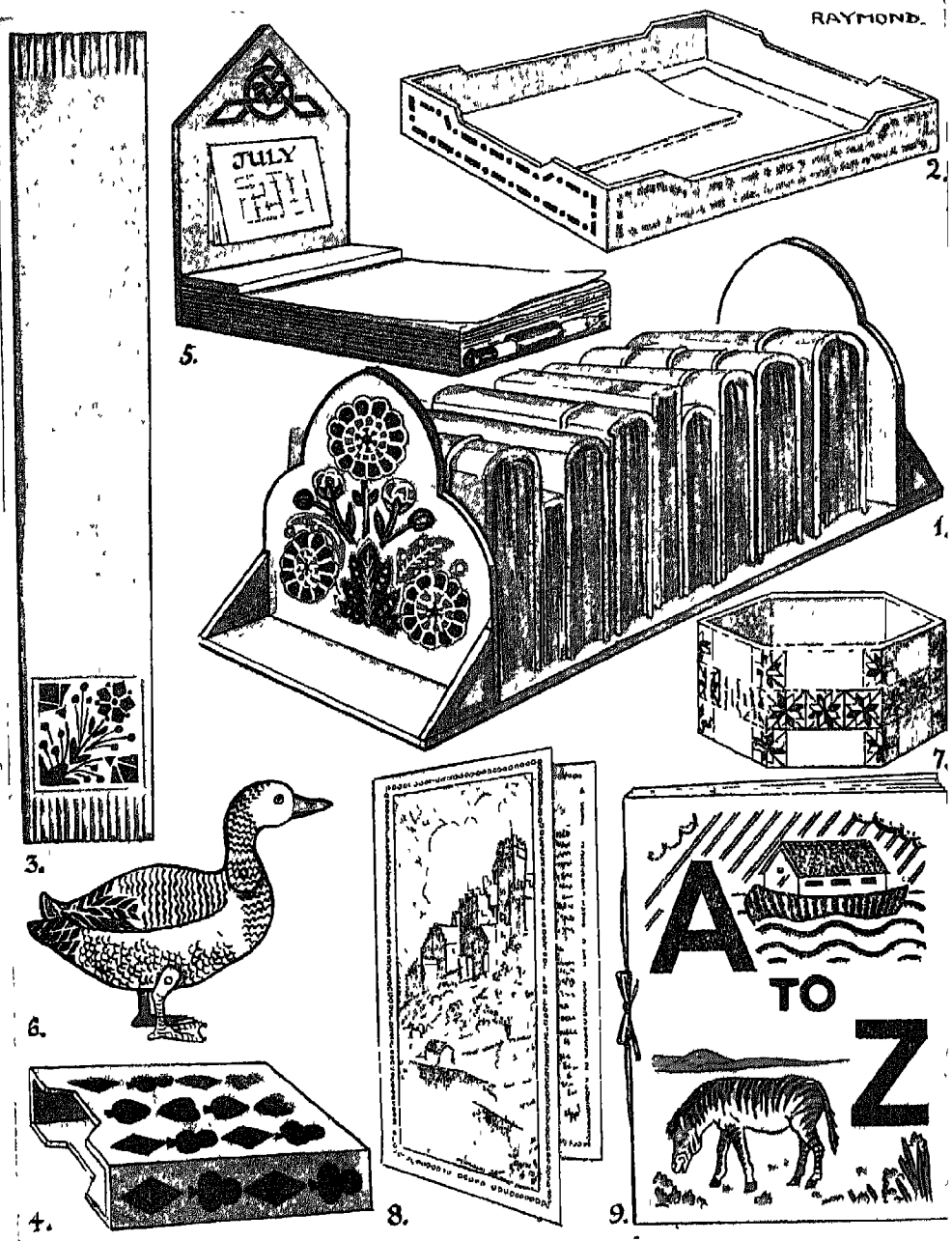
Backing can be done now with a strip of book muslin not quite so long as the book, fold the muslin through its length, fit it to the back and fasten securely. The cover of firm tinted paper can be made by placing the book lying open on the paper chosen and ruling a pencilled line round its edges Cut out the rectangle, fold it carefully to fit the book and afterwards fix it by pasting the tinted paper to the first and last pages of the book. do this by fitting the back of the book to a line drawn down through the centre of the tinted paper shape, taking care to keep its long edges level Paste the right

Two Sections of Book Arranged for Sewing

PLATE LXXIX

HANDWORK—SIMPLE BINDING, ETC

1 Book Stand.
2 Paper Tray
3 Suède Bookmark.
4 Holder for Playing Cards
5. Calendar and Note Pad.
6 Duck
7. Hexagonal Napkin Ring
8 Postcard Folder.
9 Alphabet Book

half of the tinted paper and carefully fix the end page to the inside of the cover. Still keeping the book held in position, fasten the first page to the other half of the cover The book should now be pressed and dried, after which it is ready for decoration, which can be done at this stage by direct brush-work and pen lettering The alphabet book shown on the Plate, Fig 9, was made in this way.

Exercise 2.—For purposes of revision, the teacher is advised to encourage the children to undertake in a new form projects which have been taken previously in the course. The teacher might suggest a list from which the children would make their choice, or they might devise their own. the following examples are typical —

The folder postcard is prepared for writing and has the edges gummed for fastening on the outside a picture postcard is fixed to one side, the other side is prepared for the stamp and the address, Fig 8.

The decorated bookmark is made from oiled paper or suède and is decorated at the ends, Fig 3

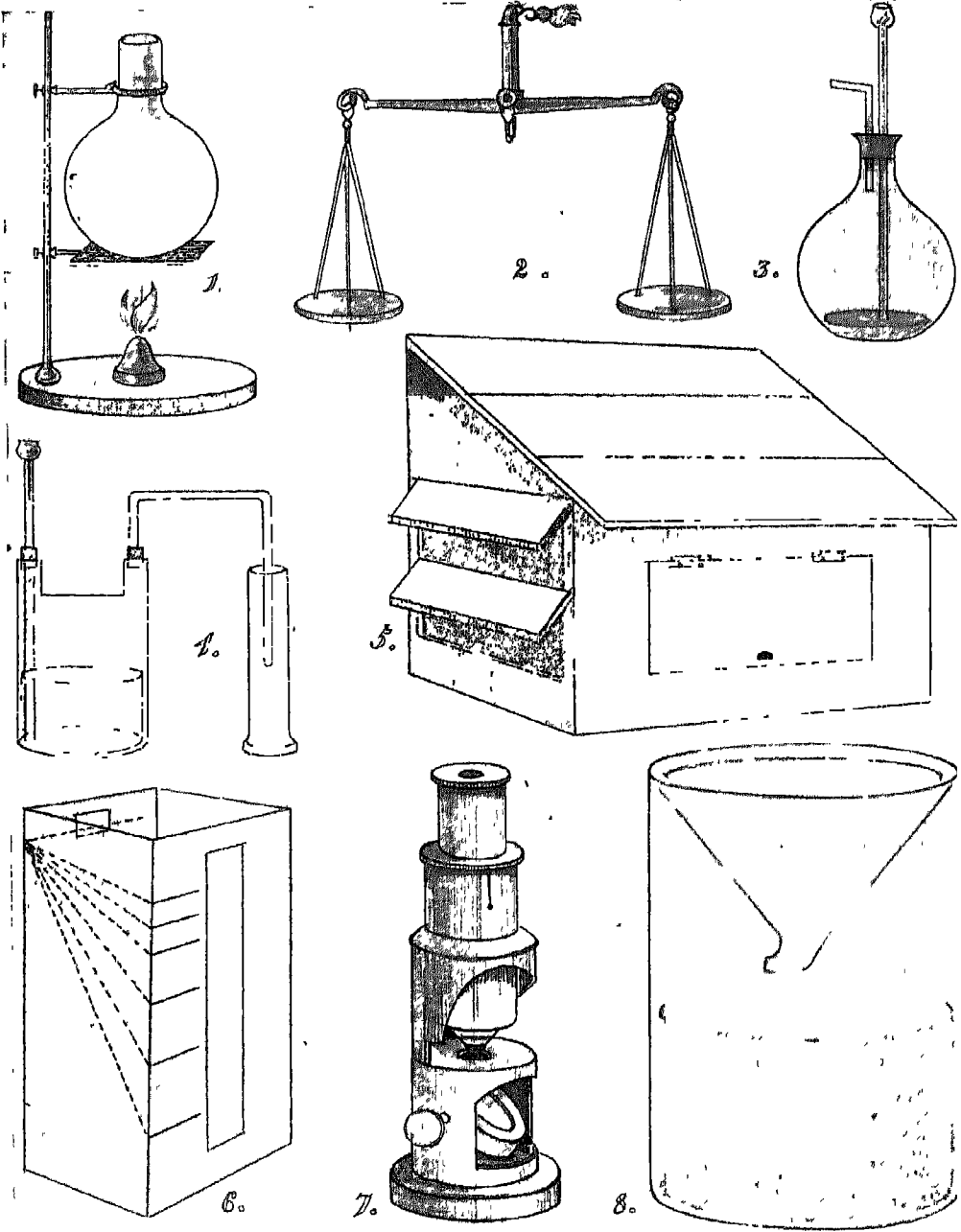
The book stand for the table is made from stiff cardboard the ends and angle joints must be made firm with strong flanges. This model can be best made with plywood, Fig 1.

Other models are illustrated on the Plate.

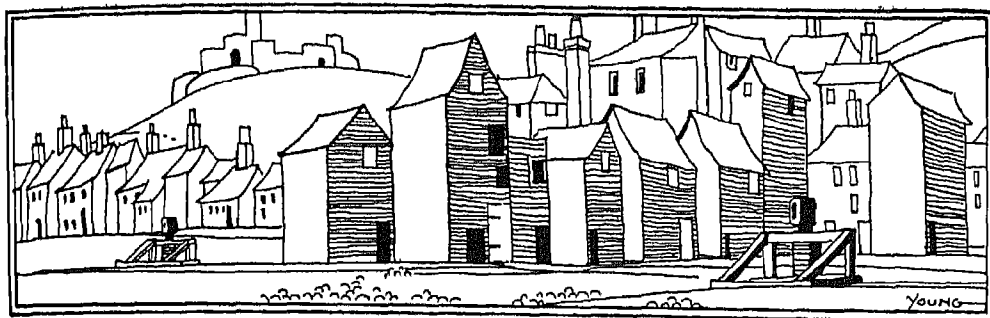
XXIX. SCIENTIFIC APPARATUS—PENCIL

Introduction.—The application of the drawing lesson to other subjects is often overlooked, and in consequence, where graphic representations are required to illustrate principles and processes in science, geography, handicraft, etc, the drawing is often so faulty as to be misleading. Diagrammatic representation must at least be truthful, and when it is truthful it is invaluable as an aid to the study of the subject concerned It will therefore be useful to adapt some lessons to the drawing of a few typical examples. Such drawings are intended for notebooks and will be on a small scale

Exercise.—The first drawing on the Plate shows a simple scientific apparatus illustrating convection. Here we have a stand with a ring, a round bottomed flask, a piece of gauze and a spirit lamp. When the apparatus is in position, the teacher will draw attention to the vertical rod and the series of ellipse shapes formed by the base of the stand, the ring, the surface of the water and the top of the bottle The rod will be drawn in position first and the circle of the flask will be placed in relation to it. The neck of the flask is a cylinder curving on to the circle. Now place the ellipses in position starting from the top: note the slight change in the width as we reach the base of the stand. Draw the lines from the ring to the rod and indicate the screw joint. On the stand we now indicate the spirit lamp as a simple cylinder shape with a cone-shaped top: the gauze is a narrow shape of brown.

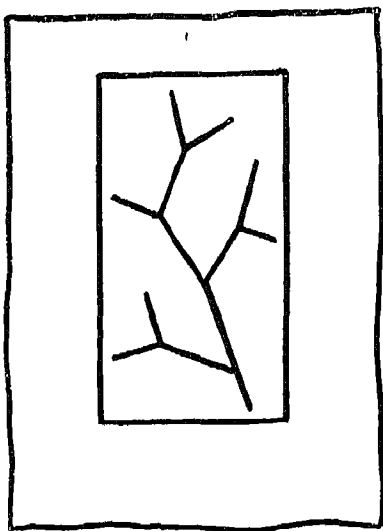
A few similar exercises in pencil drawing of simple groups of scientific apparatus placed in position will form useful practice and greatly improve the quick execution of sketches made in notebooks. Further examples are given in the Plate Some are more difficult than others, but the children of a class should not all necessarily be required to draw the same set of objects, for the executive ability of some children is far greater than that of others.

SCIENTIFIC APPARATUS—PENCIL

1 Flask and Lamp 2 Scales 3 and 4 Preparation of Gas. 5 Thermometer Screen 6 Sun Calendar 7 Microscope 8 Rain Gauge.

XXX. DRAWING FROM MEMORY

The following exercise on the drawing from memory of a plan of a house is given for the purpose of training the children to visualise well-known objects and to understand the general idea of a plan There is no place which makes a stronger appeal to a child's senses than his own home. For this reason each child should make a drawing of the plan of the house in which he lives. Ask the children to draw a shape which would enclose all the rooms on the ground floor of the house. Now draw lines indicating the road and pavement in correct positions. Mark the position of the entrance to the house and from that place show the main passage through the house. Draw lines dividing the floor space into rooms as they are remembered, taking care to show their relative sizes Show how the rooms are entered from the passage, and the positions of the windows and fireplaces. The staircase will occupy some of the space and this must be included in the plan. The scullery and offices must come within the drawing of the house, and when all is complete each child should make an imaginary tour of the ground floor tracing his progress with the pencil. The drawing can be lettered to name the principal parts, and the name of the road should be indicated in the appropriate space. The drawing will be complete when we show correctly the cardinal points This can be done by letters or by a vane placed in a space near the drawing.

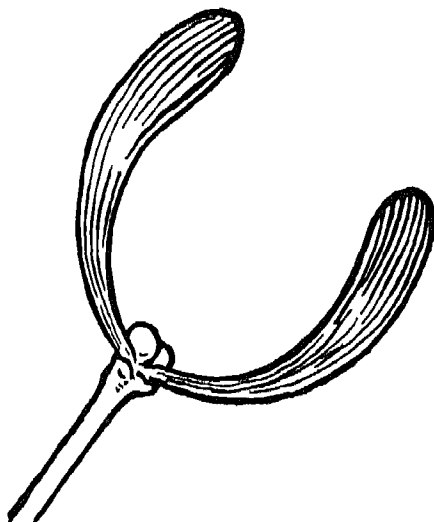
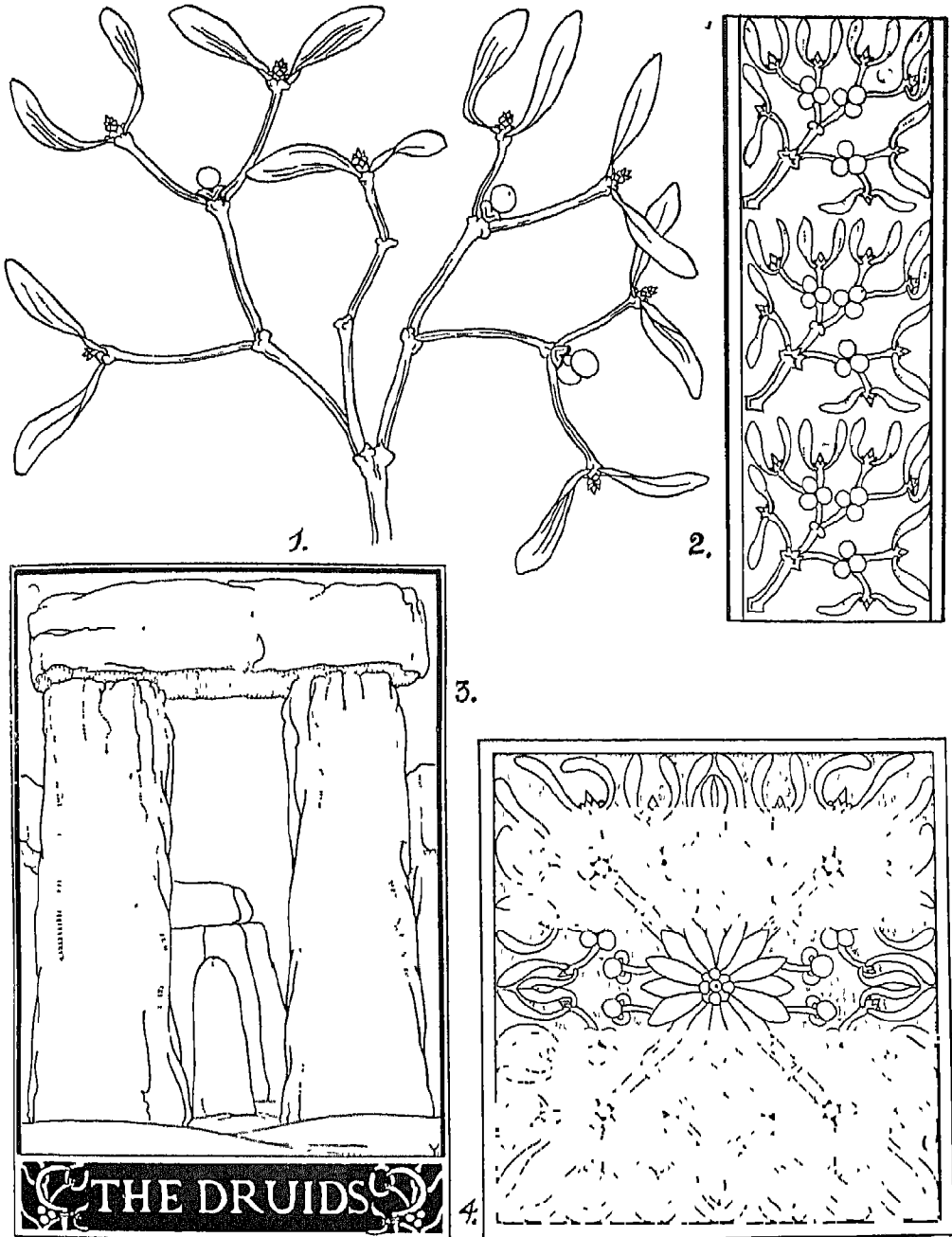
A similar exercise can be given in drawing a plan of the chief roads near the school or those in a child's home surroundings

XXXI. DRAWING FROM NATURE—PENCIL AND PATTERN MAKING

Exercise 1.—As the festival of Christmas draws near, children are always keenly interested in drawing some of the forms in nature which are usually associated with that joyous season Exercises in drawing the holly were given on page 243, and the following exercises are concerned with the mistletoe. Display a few sprays of mistletoe against a dark background, so that all sections of the class can see one of them effectively. Each child should use the paper "finder" and look carefully at the spray

PLANNING THE MISTLETOE STEM BY MEANS OF THE "FINDER"

to discover its main characteristics It is a good plan to let the children draw a small rectangle at one side of their paper, and in this shape indicate the general direction of the stem This test of perception will have much to do with the accuracy of the drawing of the spray, for while at a casual glance the directions of the different parts appear to be erratic, careful observation discloses perfectly regular and well-defined angles between the almost equal sections or nodes. Mistletoe, too, affords a good example of a non-continuous stem Children are apt to see all stems as a continuous line: this exercise should correct the wrong perception that stems are like straight rods The thickening of the stem as the joints are approached is clearly shown in the mistletoe. Having made their observations the children should draw a large rectangle of the same shape as their small copy, and set out the general position of the stems (A method of drawing proportional rectangles was explained on page 91.) The thickness of the stem and the form of the joints are next indicated, and lines are added to show the position of the leaves These usually occupy a wide angle, or they curve into the shape of a horseshoe. Add the narrow oval-ended leaves and place the berries as they are seen at the junction of the nodes, Fig. 1.

Exercise 2.—Apart from its peculiar interest as a natural form, the children will think of the mistletoe first as a means of decoration. A unit lends itself to border pattern (Fig 2) and as a design for book covers and greeting cards Having drawn its natural form, the children can pick out the characteristic parts which can be used effectively for pattern purposes. The book cover to be decorated might be entitled *The Druids*, Fig 3. For greeting cards the children should be permitted to devise their own patterns and add a suitable "wish" in good lettering Girls might adapt the *motif* for a simple embroidery pattern

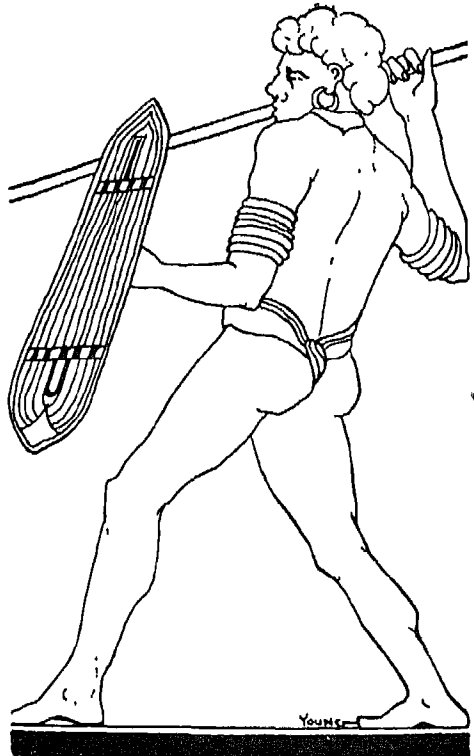
A suggestion for filling a space with a mistletoe pattern is given in Fig. 4.

HORSESHOE SHAPE OF MISTLETOE LEAVES

Drawing from Nature—Pencil and Pattern Making

1. Spray of Mistletoe
2. Border Pattern with Mistletoe Motif
3. Book Cover
4. Space Filling with Mistletoe Pattern

XXXII. IMAGINATIVE DRAWING FOR THE GEOGRAPHY AND HISTORY LESSONS

Introduction.—It will serve a useful purpose if the children are asked to apply their drawings to the illustration of definite objects and people of other lands There is little doubt that children are greatly interested in people whose appearance and dress are strangely different from their own. By the use of pictorial illustrations and handwork, and from descriptive accounts read in their geography lessons, the children acquire concepts which they should be allowed to express graphically. The effort of memory to recover these impressions in order to express them will form a valuable aid to the instruction given. Mental images from the picture book, processes and shapes from the handwork, the atmosphere created by the description, will all be recovered and used

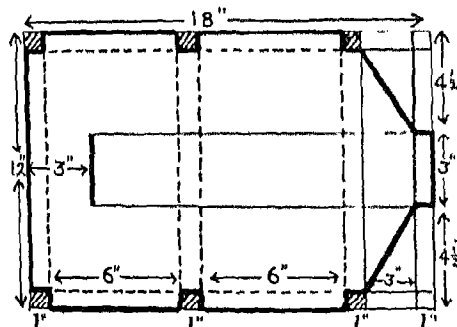
Exercise 1.—Tell the children that they are to draw one of two figures—a native of the hot grasslands or a native of the hot dry lands. (Other exercises may be chosen at the teacher's discretion.) The former will probably suggest a picture of Negroes working in a sugar plantation, in the cotton fields, or among the banana groves. One figure

A DUTCHMAN

A GLADIATOR

only is required, but any suggestion of environment will be valuable. In the latter example, a native of the hot dry lands, the image will probably be that of an Arab with his camel in the desert. It will be interesting to note how successfully the children express the contrast in costume—the loin-cloth or scanty garments of the negro, and the loose flowing robes and headdress of the Arab.

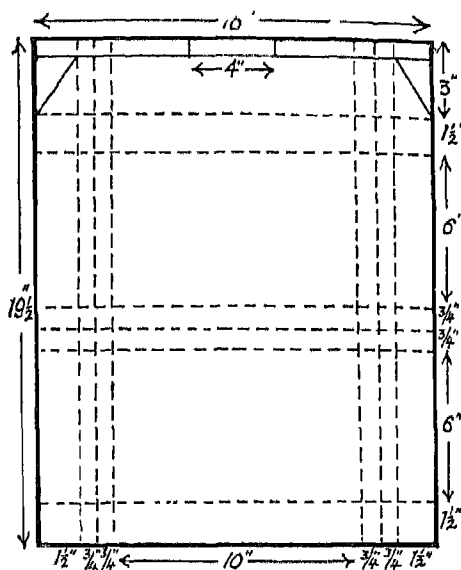
Exercise 2.—A greater contrast in dress can be expressed if the children are asked to draw a worker in the rice fields of India or China and an Eskimo or Laplander of the cold lands A few remarks concerning the occupation and life of these people might preface the effort of the children, but their imagination should be allowed full scope in their drawing The children can correct any wrong impressions by reference to pictures or by seeing drawings which have been successfully done and exhibited to the class. It will be seen that such application of memory and imaginative drawing can be of the greatest possible use not only in the preparation of illustrations for note-books, but in guiding the teacher to observe the mental effect of instruction in such subjects as geography, history or literature. Material for similar lessons can be found in abundance.

XXXIII. HANDWORK—PORTFOLIOS

Exercise 1.—The portfolio illustrated on the Plate, Fig. 1, is made from a sheet of stout paper, 12 in. by 18 in. The accompanying diagram illustrates the plan with the required measurements of the lay-out. Folding is done with the aid of a straight edge, and the sides are secured by the flaps indicated between the small hatched squares. The portfolio can be strengthened and made more attractive if, before folding, the paper lay-out is pasted to linen or crash, and the whole shape is cut out of the material. The slit for securing the flap is 3 in. from the left of the covering lid.

Plan of the Portfolio

Exercise 2.—A portfolio with double folds is illustrated on the Plate, Fig 2. For this model use medium grade cardboard 19½ in. by 16 in. On each of the long sides of the paper lying in an upright position, mark off the following measurements beginning at the top:—3 in , 1½ in., 6 in , ¼ in., ¼ in., 6 in. and 1½ in : join the points on each side by level lines, noting the folding lines (dotted) as seen in the diagram. Now mark on each side of the base and top lines the measurements shown in the diagram—1½ in., ⅜ in., ⅜ in Join the points with dotted lines as shown. The flap can be shaped as shown in the plan, or the children can devise one for themselves Folding must be done very carefully with the help of the ruler: the method is illustrated in Fig. 2 on the Plate. A more substantial portfolio can be made by covering the outside of it with bookbinders' cloth before folding. Decoration can be done by direct brushwork, or, as an alternative to this, Spatter or Crackle decoration might be applied. Spatter can be used by taking up some colour on a toothbrush and rubbing it over a wire screen held just above the surface to be treated: more than one colour may be used. The Crackle method

will give the appearance of tooled leather (see Fig 3) To do this, crumble a piece of glazed wrapping paper, crackling it into an irregular pattern Dip it into dye for a minute or two, and afterwards remove and squeeze it almost dry Now unfold the paper and press it with a hot iron. The decorated paper can be pasted to the model and will give it a good finish The crackling of the paper causes the dye to take unevenly, so giving the finished appearance of a mottled surface. Ordinary dress dyes may be used; tea or coffee can also be used effectively.

Further exercises are suggested by a Blotting Book (Fig 4), a Stationery Holder (Fig. 5) and a Postcard Book (Fig. 6). In the last mentioned model the leaves prepared for postcards are pasted to stubs of folded material which are bound in cardboard covers no sewing is required as the leaves, stubs and covers are all bound together with paste or glue, Fig 6

PLAN OF A PORTFOLIO WITH DOUBLE FOLDS

XXXIV. BRUSHWORK AND PATTERN MAKING

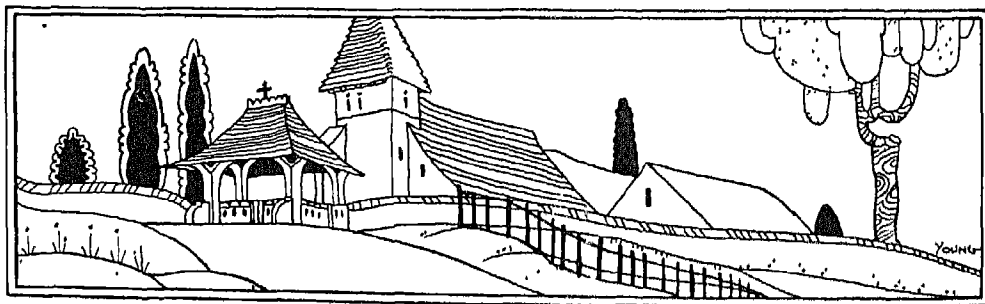
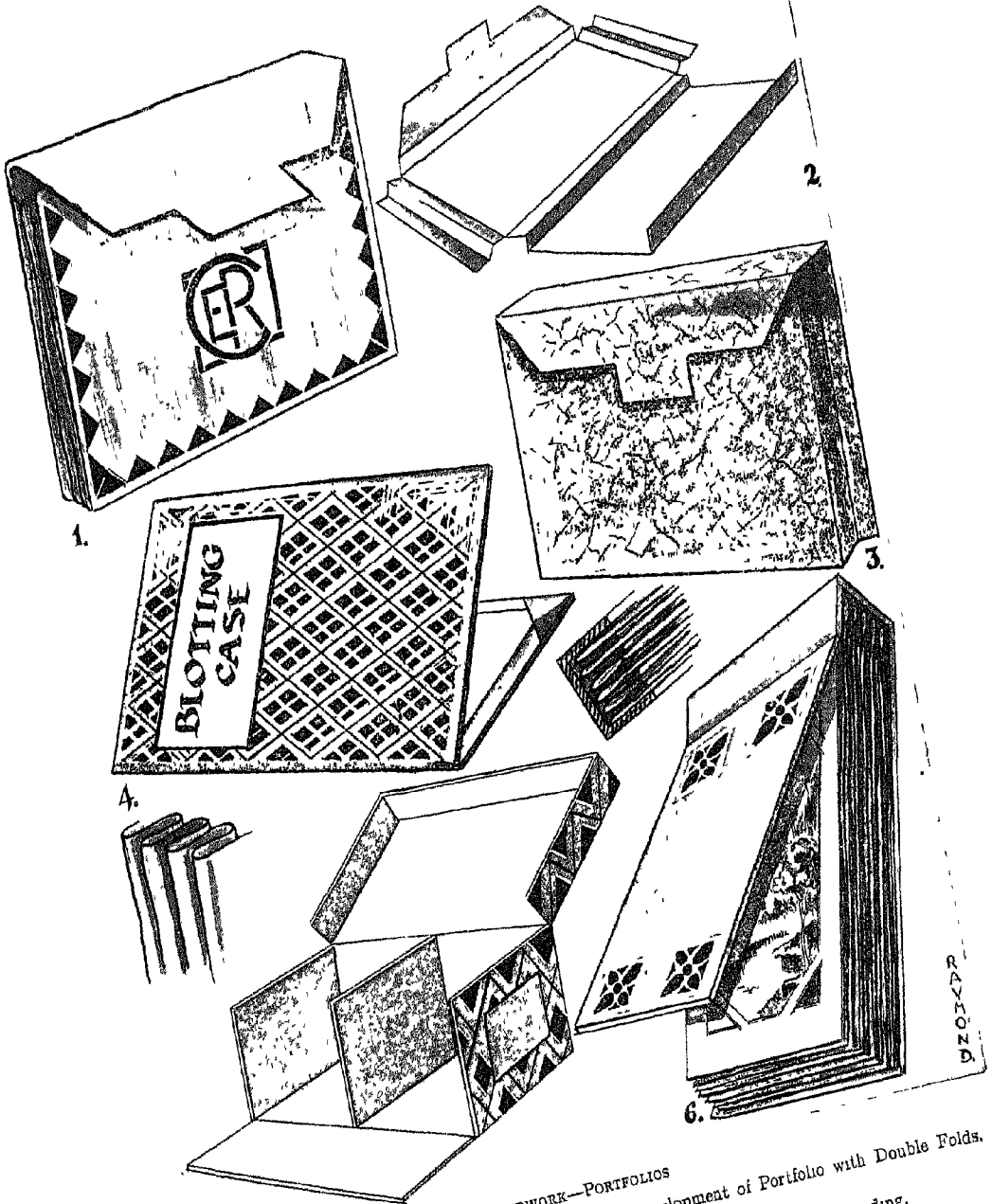
(Colour Plate No. 168 D in the portfolio.)

Exercise 1.—Discuss with the children the general shape and appearance of trees. They are to be considered in mass, and as such they present fairly definite shapes. Draw rough outlines on the blackboard showing the triangular shape of the firs, the rounded shape of the oak, the long ellipse enclosing the poplar, etc. The children will choose one shape and consider how to render it in pattern. Other mass features which will occur to them are the ray lines formed by the branches, the smaller masses made by

PLATE LXXXII

HANDWORK—PORTFOLIOS

1 Portfolio—Covered and Decorated.
2 Development of Portfolio with Double Folds.
3 Portfolio Completed with Crackle Covering
4 Blotting Case.
5 Stationery Holder
6 Postcard Book with Stub Binding.

branches of foliage, the openings showing the sky spaces between the masses, and the dark patches made by overhanging leaves. They will use these various massed forms as features for their pattern shapes. The drawings should not be large and should be made for the purpose of decoration, Figs. 1 and 2 on the Colour Plate. Flowering trees like the chestnut, or plantation shrubs like the rhododendron, suggest spot decoration of a charming character, Figs 3 and 4. Fruit trees, also, may be included to supplement those already taken. A border design is illustrated in Fig. 5.

Exercise 2.—The lessons may be delightfully extended by drawing a decorative picture in which some of the subjects of the pattern are included Apart from suggestions for the elements of the picture, no instruction is required for the exercise. It should consist in the expression of pattern and colour derived from the children's lessons in this subject, in conjunction with their exercises in memory and imaginative drawing, Fig. 6

A pleasing exercise in pattern and colour is provided in planning rural surroundings. To children who have made sketches for outdoor geography it will present little difficulty, and will provide an excellent medium for pattern work in an attractive and useful form. The various features chosen as typical of the surroundings can be mapped out and set down with the idea of making a colour pattern, Fig. 7.

XXXV. DRAWING FROM NATURE

Introduction.—In the search of material for drawing from nature many beautiful forms are almost entirely overlooked by those who keep to the beaten track of research. We are inclined to accept the usual flowers and leaves provided by our own gardens or those suggested in books, but if we go afield and encourage the children to look for and collect specimens of the wild flowers that are to be found in the byways outside the town, a new and almost unexplored source is opened up. In rural districts wild flowers are easily accessible, but even so they are not largely used in drawing from nature or in pattern making, and yet these forms, so varied and abundant, present all the elements required for the purpose.

At this fourth year's stage of the drawing lessons the children will be generally proficient in producing good representations of flowers and leaves, and they will gladly bring to school a variety of specimen plants for a drawing lesson

Exercise.—As wild flowers are generally much smaller than the cultivated varieties it will usually be necessary for the children to arrange their specimens to be drawn as sprays. Here the "finder" will be of great assistance It will be seen that each spray has some distinctive features which will recall such principles of drawing as radiation and balance Care must be taken that every child sets about his work in a proper way by indicating the main lines and marking off the spaces. The children should be reminded to look carefully at their specimen and decide how best to plan its salient features. It is only after a considerable amount of practice that children will begin their drawings of flowers and leaves in the right way, but the work will never be satisfactorily done until the children have really grasped the underlying principles of representation. The shapes and colours of the flowers will be suggestive of an endless variety of ideas for making patterns, and in future lessons the children

PLATE LXXXIII

DRAWING FROM NATURE

1 Wood Loosestrife 2 Ragged Robin 3 Dwarf Red Rattle 4 Thrift
5 Bladder Campion 6 Common Mallow 7 Borage 8 Field Gentian
9 Meadow Crane's-bill 10 Pattern Unit 11. Pattern from Bladder Campion

should be encouraged to use as a *motif* for the decoration of some object either the whole or a part of a wild flower

Most of the sprays of wild flowers will need to be drawn with light, clean strokes.

The *Wood Loosestrife* or *Yellow Pimpernel* (Fig 1) has a delicate form with a trailing stem on which the oval-shaped leaves grow in pairs; the starlike flower has five broad pointed petals and a circle of the same number of delicate stamens.

The *Ragged Robin* (Fig 2) has bright pink flowers with a rather tattered appearance owing to the five petals being divided into strips, the calyx is particularly interesting

The *Dwarf Red Rattle* (Fig 3) has clawlike, rosy coloured petals and a distinctive calyx, the seed case provides a useful *motif* for pattern making

The *Thrift*, which grows in masses by the seacoast, has a rounded head of flowers, each flower with five pink petals, its mat of grasslike foliage gives it the name of Lady's Pincushion (Fig. 4).

The *Bladder Campion* (Fig. 5) has a distinctive appearance and its features will readily be noted—its egglike calyx with five deeply divided white petals In Figs 10 and 11 the flower has been used for pattern making

The *Common Mallow* (Fig. 6) is a large plant with broad leaves and a thick hairy stem; the flowers have five beautiful mauve petals

The *Borage* (Fig. 7) is one of the most striking and handsome wild flowers the azure blue flowers have five starlike petals and a purple cone-shaped centre. The leaves (which from their shape probably give it the name Oxtongue) are tongue-shaped and rough.

The *Field Gentian* and *Meadow Crane's-bill* (Figs 8 and 9) are included both for beauty of form and colour, the radiation of the stems and foliage should be specially observed in the Crane's-bill

XXXVI. IMAGINATIVE DRAWING

Introduction.—The use of action figures and the exercises for memory training which have been given in this course will greatly assist the children to make "snapshot" drawings of incidents depicting movement. Such exercises test the memory of things previously observed and encourage the children to develop their own creative work. In a recent drawing lesson of this kind, the impression of exhilarating movement was well expressed by a boy's drawing of a motor car which in a few simple lines indicated the bonnet, door and hood; spokeless wheels; a lady's head with a flying scarf, and clouds of dust When children have been encouraged to work freely they will become generally more observant, and their work will develop towards accuracy.

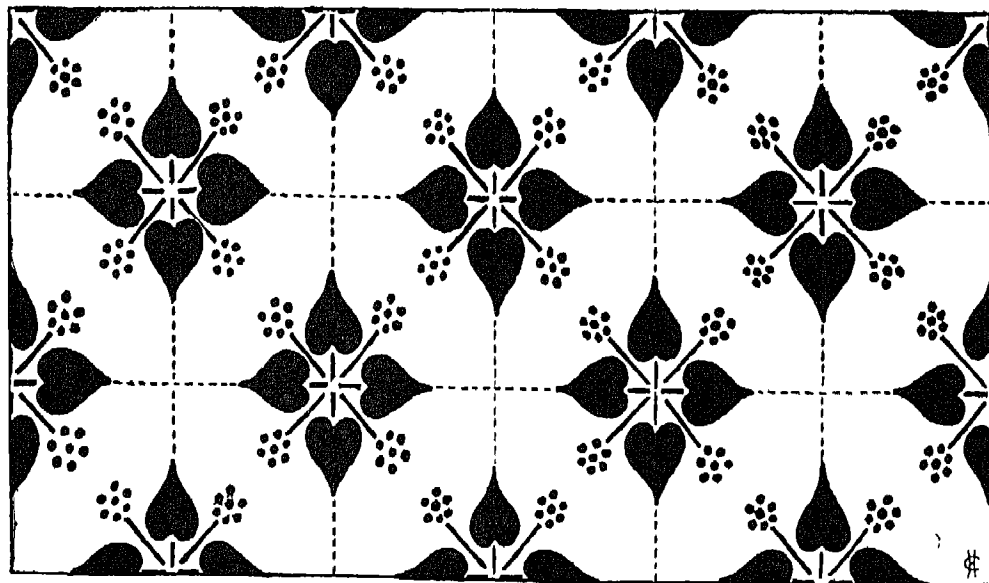
Exercise 1.—Let the children draw their impression of a game played by two or three boys or girls. It is not advisable that the same game should be illustrated by the whole class, for some will prefer one game and others will choose another. The drawings should be done on a fairly large scale and, especially in early attempts, too many figures should be avoided. The class might make their selection from Leapfrog, Pick-a-back, Wrestling, Skating, Skipping, Spinning Tops, Playing Marbles, Hopscotch, "Horses" and Statues In these examples the children will be concerned with pose and movement, and these will be expressed by action lines which will be more important at this stage than accuracy of dress and details of form

[*Reproduced by courtesy of the Royal Drawing Society*
"SNAPSHOT DRAWING" BY NORA UNWIN

Exercise 2.—The foregoing exercise was chosen for its immediate association with school activities, but it is possible that greater mental activity will be aroused by drawing incidents of the home or the street. A wider range of subjects will be introduced, and the children will have greater scope for testing their observation and exhibiting their skill. Give the class several subjects from which the children will make their choice; for it is important to remember that they are not all attracted by the same subject, and that to deprive the lesson of interest to any degree is to lessen mental stimulus The following subjects are suggested· Workmen at Dinner, a Street Accident, Putting up the Christmas Decorations, a House on Fire, a Dog Fight, a Windy Day, Catching a Train, a Skating Accident, A Fair, and a Charabanc Drive. It is a good plan if possible to keep the drawings and note the development of observational power expressed in them by the children.

Holiday sketches, too, may be done by the children This has been found to produce very good results, for a large percentage of the children respond with interesting efforts The subject for illustration may be some incident of their holiday, or it may be a drawing suggested by some word such as Work, Music, Rest, Flight, Gladness, Heaviness, Speed, Age The drawings should be classified by merit and exhibited, when it will be found that the idea will "take on" with the children and that they will ask for suggestions for holiday sketches as a vacation pastime.

"Although children must be led to realise that slovenly, dirty and untidy work can never be tolerated, the teacher should understand that accuracy is a strictly relative term, and should be careful not to exact at any particular stage of progress a standard of accuracy beyond what may reasonably be expected"

Design based on the Cowslip

Design based on the Ivy

THE TEACHING OF ARITHMETIC IN THE PRIMARY SCHOOL

From the painting by Quentin Matsys—The Louvre, Paris. [*Photo Alinari*

THE BANKER AND HIS WIFE

ARITHMETIC

INTRODUCTION

IT is presumed that by the time the middle school is reached the child has acquired a fair ability to apply number to the simple problems of everyday life He will have discovered the use of number in his various activities: e.g sharing out sweets, picture cards and marbles; scoring in skipping and other games; making articles in handwork lessons, giving out books, papers, pencils, etc., for class use. Much apparatus has been devised for the teaching of number in the infant school, and success has resulted from its use, but it is well to remember that the more successful the teaching, the sooner can props of this kind be dispensed with. At the middle school stage, the time has come when, however much we try to disguise it, the drudgery of forming good habits in arithmetic must be faced.

"Whatever results may be achieved in the direction of guiding intelligence, the teaching is not really successful unless the older children are able to work examples with precision and reasonable speed. By the age of eleven years or thereabouts accuracy in simple operations should be in great measure automatic. It depends first upon a ready knowledge of tables, and secondly upon concentration." *Handbook of Suggestions for Teachers.*

Speed and accuracy will never be obtained by children of eleven years of age, unless the children of seven begin to acquire good habits of adding, subtracting, multiplying, etc. To become quick and precise in such a simple process as ordinary addition requires much labour and effort. In arithmetic as in every other school subject the zeal and personality of the teacher have tremendous influence. An enthusiastic teacher can arouse a corresponding enthusiasm in the class for learning tables; for attaining speed in subtracting, adding, dividing, multiplying, for devising short methods, and acquiring number knowledge. The arithmetic lesson can become a daily mental stimulant, and can give the child that satisfaction which comes from having tried and achieved.

The Handbook of Suggestions leaves no doubt as to what standard the child should have reached by the age of eleven:

"A minimum course for this stage should at least include a thorough groundwork in notation, a knowledge of the first four rules applied to money and the ordinary English measures of length, area, capacity, weight, and time; an elementary acquaintance with vulgar and decimal fractions, together with simple notions of geometrical form and some skill in practical measurement."

Here then, clearly set out, are the rules which must be taught in the middle school.

Daily drill.—In the articles which follow each rule is dealt with in its entirety. The work given is designed to cover the whole of the period seven plus to eleven plus. It is left to the teacher to take each rule and section according to the age and ability of the class, as and when it seems advisable. A good habit which should be formed at the outset is that of giving daily mental and oral work. All arithmetic is of course "mental," but by usage the term is applied to work done without the aid of writing. New rules can be introduced in this way, rules which are not in the current work for the week can be kept in mind, and training in short methods and rapid working can be given. A good way of arranging this work is to let each child have a small notebook in which answers only are to be written At first children will need some guidance as to the correct way to use these books. The teacher should ask

a question, each child should raise his hand as he obtains the answer. When several children in the class have signified in this way that they are ready, the teacher should say, "Write the answer,"—pause for a moment and then,—"Pens down" The teacher can thus make sure that every child is working, and that no helping figures are scribbled on the desk or blotting paper The pupils will soon become accustomed to this method of working, and the teacher will not need to give the order "Pens down," each time.

EXERCISES IN NOTATION

Oral and written work in notation and place value must be taken regularly in every class, as to some children notation presents great difficulty.

Units and Tens

1. Write these numbers in figures 5 tens and 6 ones; 7 tens and 8 ones; 3 tens and 9 ones; 8 tens and 4 ones.

2. Say how many tens and how many ones are in each of these numbers. 42, 56, 75, 89, 95

3. What is the value of the 4 in each of these numbers 84, 46?

4. In the number 57 let the 5 and 7 change places with each other What is the new number? (A way to illustrate place value is to let several children hold in front of them coloured cards each bearing one figure, and, standing in front of the class, to show 68, then, changing places to show 86, and so on)

5. How many times greater is the 2 in 27 than the 2 in 72? the 4 in 46 than the 4 in 64? the 3 in 39 than the 3 in 93?

6. Write down the value of the 6 in 69 and in 76. Take the value of the second from the first.

   In 69 the 6 stands for 60
   In 76 the 6 stands for 6

   The difference in value is 54

Hundreds

1. To lead on from tens to hundreds, use coloured number strips made up of ten units, and put ten of these strips together to make ten tens, or one hundred.

2. Write 99 on the blackboard and let the children say how many tens there are in it, and how many ones 9 tens+9 ones
   What is one more than 99?

   9 tens+9 ones+1
   9 tens+1 ten
   10 tens

Just as 9 tens is written 90 so 10 tens is written 100 And the new number is called one hundred.

Two hundreds are written	200
Three hundreds are written	300
Four hundreds are written	400 and so on

About this stage the use of the word "unit" for "one" and "units figure or digit" should be taught. It usually comes in without any explanation

3. Let the children count aloud in units from 100 to 200; then in twos from 100 to 200; then in fives from 200 to 300; from 500 to 600, and so on. Give plenty of exercises of this type.

4. To gain practice in going from one number of hundreds to the next, let the children count aloud from 191 to 210, from 289 to 306; from 385 to 420, from 497 to 508, and so on.
Next let them proceed by twos from 488 to 512; from 684 to 720, from 892 to 918. Proceed by fives from 375 to 420, from 580 to 620; from 885 to 915, etc

5. Give some numbers to be written from dictation:

4 hundreds	5 tens	6 units
7 hundreds	2 tens	3 units
9 hundreds	0 tens	7 units
3 hundreds	9 tens	9 units

As each number is written require the class to read it aloud.

6. Let the children write these numbers in a column as if they were going to do an addition sum: 29, 156, 263, 785, 568

Tell them to draw a line down	2|9
the column between the units	15|6
figure and the tens figure, and	26|3
then say how many complete	78|5
tens are in each line	56|8

In 29 there are 2 complete tens
In 156 there are 15 complete tens—and so on

Follow this with a similar exercise, but require the children to give the answer without drawing the dividing line down the column.

Thousands

To lead on from hundreds to thousands proceed somewhat as in the previous exercises.

1. Write 999 on the blackboard and let the children say how many hundreds, tens and units are in it.

9 hundreds+9 tens+9 units

What number is one more more than 999?

9 hundreds+9 tens+9 units+1
9 hundreds+9 tens+another 10
9 hundreds+10 tens
9 hundreds+another hundred
10 hundreds.

Just as 9 hundreds is written 900, so 10 hundreds is written 1000.
Instead of being called ten hundreds, this new number is called one thousand.

Two thousands are written	2000
Three thousands are written	3000
Four thousands are written	4000—and so on.

2. Let the children count aloud in hundreds from 1000 to 2000; from 3000 to 4000, from 7000 to 8000, etc; then count in fifties from 1800 to 2100; from 3600 to 4200, from 8900 to 9300
A useful variation in counting is to count backwards.

3. Dictate some numbers for the children to write in their books, or on paper. e.g 2 thousands, 5 hundreds, 7 tens, 9 units. Repeat—two thousand, five hundred and seventy nine.

4. Another day, when notation work is being done, write a column of numbers on the blackboard and let individual children, or groups, read them aloud.
An exercise similar to one given above may be used for stating the number of complete hundreds Dictate several numbers and tell the children to write the numbers carefully under one another, units under units, tens under tens, etc.

Let them draw a vertical	3|29
line between tens and	26|73
hundreds, and then tell	50|28
how many complete hun-	31|00
dreds are in each number.	7|63

In 329 there are 3 complete hundreds.
In 2673 there are 26 complete hundreds.

This may be followed by a similar exercise, in which the children are required to give the answer without drawing the dividing line.

Revision

Frequent revision of notation should be taken in the mental drill. Some exercises such as the following should be given if possible once a week.

1. Dictate numbers which the children are to write on paper or in books: 1200, 5279, 803, 1080, 7004, 2919, 5601, 8002.

2. Write numbers on the blackboard and require groups or individuals to read them aloud.

3. Ask for numbers written on the board to be written in words on paper

4. Give questions:

(*a*) What is the value of the figure 5 in 25? 153? 5279? 561? 5684? 705?
(*b*) What is the value of the figure 8 in 809? 48? 8572? 386? 28? 4873?
(*c*) What is the difference in value between the two fives in 55? the sixes in 66? the ones in 101? the eights in 88?
(*d*) What number is 1 less than 100? 1 less than 1000?
(*e*) What number is one-half of 100? one-half of 1000?

A useful device—The following is a useful device to extend the knowledge of notation to tens of thousands, hundreds of thousands, millions, etc

Each child draws in his book three long boxes which are side by side. Each box has three divisions in it The first box is for units, the second for thousands, the third for millions In each box there are places for units, tens and hundreds The teacher then says aloud a number, which each child has to write, putting the figures into the correct boxes and divisions of the boxes

millions			thousands			units		
h	t	u	h	t	u	h	t	u
			5	6	0	0	0	7
		9	9	1	9	0	1	9
				6	5	7	0	3

In writing a number, when a column has to be passed over because no figure is to be put into it, a nought must be written instead of leaving the column empty, e.g. 560,007; 9,919,019; 65,703. The spaces between the boxes are the places where a comma should be written Children regard this exercise as a game, and thoroughly enjoy filling the boxes, particularly the "millions box" It is surprising what a difference it makes to their notation, and how rapidly accuracy is acquired. The boxes can soon be dispensed with, but the knowledge remains.

THE SIMPLE RULES

The foundations of arithmetic are the simple rules These rules must be taught first, and it is well to examine them carefully, and to see that every device is employed to ensure that the foundations are sound.

Addition

Before any written work is attempted it is necessary to give constant and varied oral and mental practice in rapid addition. An addition table may be constructed, and when this has been mastered great progress will be made in rapid and accurate addition.

Addition Table

2	+	0	=	2
2	+	1	=	3
2	+	2	=	4
3	+	0	=	3
3	+	1	=	4
3	+	2	=	5
3	+	3	=	6
4	+	0	=	4
4	+	1	=	5
4	+	2	=	6
4	+	3	=	7
4	+	4	=	8
5	+	0	=	5
5	+	1	=	6
5	+	2	=	7
5	+	3	=	8
5	+	4	=	9
5	+	5	=	10
6	+	0	=	6
6	+	1	=	7
6	+	2	=	8
6	+	3	=	9
6	+	4	=	10
6	+	5	=	11
6	+	6	=	12
7	+	0	=	7
7	+	1	=	8
7	+	2	=	9
7	+	3	=	10
7	+	4	=	11
7	+	5	=	12
7	+	6	=	13
7	+	7	=	14
8	+	0	=	8
8	+	1	=	9
8	+	2	=	10
8	+	3	=	11
8	+	4	=	12
8	+	5	=	13
8	+	6	=	14
8	+	7	=	15
8	+	8	=	16
9	+	0	=	9
9	+	1	=	10
9	+	2	=	11
9	+	3	=	12
9	+	4	=	13
9	+	5	=	14
9	+	6	=	15
9	+	7	=	16
9	+	8	=	17
9	+	9	=	18

The children should also master the additions with the smaller number first. A child may be able to give immediately the answer to 8+5 and hesitate about the answer to 5+8, the "bond" in the second case being perhaps weaker than in the first case.

Useful work can be done by counting aloud. Sometimes the whole class can count together, and then, to vary this plan, the counting can be done by groups of children. Divide the class into four or more groups, and let each group in turn make an addition The children soon understand that they must be ready to say their number quickly when it is their turn.

1. Begin at 2, and add 2 each time,—2, 4, 6, 8, 10 . . . .
Begin at 1, and add 2 each time,—1, 3, 5, 7, 9 . . . .
Begin at 3, and add 3 each time,—3, 6, 9, 12, 15 . . . . . .
Proceed similarly with other numbers: 4, 8, 12, 16, 20, etc; 5, 10, 15, 20, 25, etc.
Work through all the numbers up to 9. The additions should proceed well beyond the limits of the ordinary multiplication tables.

2. Vary the counting by beginning with a different number.
Beginning at 4, add 3 each time,—4, 7, 10, 13, 16 . . . . . .
Beginning at 5, add 3 each time,—5, 8, 11, 14, 17 . . . . .
This practice can be extended from class to class, the difficulty being gradually increased.
Beginning at 5, add 4 each time,—5, 9, 13, 17, 21 . . . . . .
Beginning at 6, add 7 each time,—6, 13, 20, 27, 34 . . . . . .

3. Another variation is to add first one number and then another.
Beginning at 3, add first 3, then 4,—3, 6, 10, 13, 17 . . . . . .
Beginning at 2, add first 5, then 6,—2, 7, 13, 18, 24 . . . . .

4. When the children are proficient at these additions, a higher number may be used as the starting point

Beginning at 29, add 6 each time,—29, 35, 41, 47, 53 . . . . .
Beginning at 53, add 7 each time,—53, 60, 67, 74, 81 . . . . .
Beginning at 126, add first 7, then 8,—126, 133, 141, 148, 156 . . . . . .
Beginning at 219, add first 8, then 9,—219, 227, 236, 244, 253 . . . . .

The teacher can keep the children keen and alert in these countings by gradually diminishing the size of the groups which are taking part, and so increasing each child's personal responsibility for giving the correct answer each time. Sometimes the children can answer in pairs, the teacher pointing rapidly to the pair who are to answer next, and allowing a mark to the child who makes the addition first.

5. In the top classes the children who have mastered additions with numbers up to 9, can work more difficult examples

Begin at 5, and add 12 each time,—5, 17, 29, 41 . . . .
Begin at 4, and add 13 each time,—4, 17, 30, 43 . . . .
Begin at 6, and add 14 each time,—6, 20, 34, 48 . . .

6. Children are usually interested in number sequences, and the exercises can be varied by giving the first few numbers of a sequence.

Continue, or extend, these lists of numbers —

(*a*) 5, 7, 9, 11, 13 . . . . .
(*b*) 8, 13, 18, 23, 28 . . . .
(*c*) 3, 5, 8, 10, 13 . . . . etc

This of course demands more than the ordinary addition, but a class of children usually welcomes the challenge to its intelligence.

7. Another useful device for improving addition is a ring of numbers written on the blackboard. The teacher points from number to number, and the class adds aloud or silently. If the additions are made silently, then the answers may be written down, or certain children may be chosen to give them.

```
        5                               8
    2       4                     15          4
9       6       7             10        9          11
    3       8                      7          6
                                        13
```

Another way is to add the numbers in pairs, the teacher pointing to two numbers at once, e.g. $15+9=24$, $13+8=21$.

8. Addition can be tested by the teacher dictating numbers which the children are to add mentally. They should write down their answers, so that the teacher knows exactly how many are correct each time. Accuracy must never be sacrificed to speed. The essential with addition is that it must be correct. It is useless to increase the speed of work before the children are regularly getting the answers correct The rapid answer which is wrong is worthless. Later, when the children are accurate, any of the exercises given above may be used for an "addition race." Each child is given a long slip of paper, the teacher writes

a starting number on the board, e.g 7, and tells the children to add 3 each time and to stop at the first number more than 150, or 200 As soon as ten children (less or more as the teacher chooses) have finished, the whole class must put down pens Each child takes as his score, the number of correct additions he has made.

9. Children should understand that, as $9+4=4+9$ and $19+4=14+9$, the units figure is 3 wherever 9 and 4 are added, the units figure is 5 wherever 8 and 7 are added, and so on. Oral exercises of this kind are useful

What is 7 plus 6?	What is 9 plus 7?
What is 17 plus 6?	What is 29 plus 7?
What is 27 plus 6?	What is 49 plus 7?
What is 37 plus 6?	What is 9 plus 17?
What is 67 plus 6?	What is 9 plus 27?
What is 87 plus 6?	What is 9 plus 47?

10. Following the above, practice in complementary addition may be given. This is of course a form of subtraction, but it is a most useful exercise for obtaining accuracy

(*a*) What must be added to each of these numbers to make 10.—2, 4, 6, 8, 3, 5, 7?
(*b*) What must be added to each of these numbers to make 20.—18, 16, 15, 14, 11, 7, 3, 9, 8?
(*c*) What must be added to each of these numbers to make 30·—25, 22, 19, 17, 16, 5, 8, 4, 3? etc.

11. In the daily mental work the form of the question should be varied as much as possible. The same process may be required, but it should be asked for in a different way Following are some more mental exercises in addition·

(*a*) Add together 6 and 9; 16 and 9; 26 and 9.
(*b*) Add together 5 and 8; 5 and 18, 15 and 8.
(*c*) What number is greater than 7 by 5?
(*d*) What number is greater than 19 by 7?
(*e*) Find the sum of 3, 4 and 7, 6, 7 and 9; 8, 9 and 5.
(*f*) Find the sum of 7, 4 and 12, 5, 3 and 13; 2, 9 and 14
(*g*) John had 26 cards. Tom had 9 more. How many had Tom?
(*h*) A man had 17 hens, he bought 1 dozen more How many had he then?
(*i*) Tim took 29 stamps from a book, 7 were left. How many were there at first?
(*j*) When 17 sweets were taken from a bag 9 were left. How many were there at first?
(*k*) A farmer had 1 dozen pigs He sold 5, and bought 7 more. How many had he then?
(*l*) Sam had 20 marbles. He gave 9 away, and won 6 more How many had he then?

12. Before leaving the infant school, children have probably been taught to set down and to work formal addition sums. By regularly using the exercises given here, and by varying them according to the age and ability of the class, the teacher will be able to proceed with written work of increasing difficulty. As soon as two columns of figures are used

the "carrying" figure is a difficulty. Children soon learn how to deal with this, but it may be necessary at first to allow them to write it down Some teachers like to have the total of each column written down in full, and an addition of these totals made

	(a)		(b)
	77		8327
	39		548
	48		2639
(a)	23	(b)	6575
	——		——
	27		29
	160		16
	——		19
	187		16
			——
			18089

This method of course entails a second addition at the end, but is useful as a check when long columns of figures have to be added. Children should form the habit of checking their answers even with their first written sums. In addition they may check by adding a second time, proceeding in the opposite direction, from the top line downwards, instead of from the bottom line upwards From time to time a good variation may be made by putting addition sums on the board in lines, instead of in columns, and having the sums worked horizontally, first the units, then the tens, then the hundreds, etc.

(a) 15+79+3+24=
(b) 136+9+285+93+219=
(c) 49+358+4760+2078+9=

13. The old exercise of long "tots" and cross "tots" gives practice in adding horizontally as well as vertically, and the addition of the separate totals forms a check on the working

	A	B	C	Totals
1.	32	57	85	
2	76	8	29	
3.	9	38	15	
Totals				

Grand Total

	A	B	C	D	Totals
1	29	468	342	319	
2	287	59	168	736	
3	154	283	76	545	
4	378	605	129	77	
Totals					

Grand Total

14. Another useful exercise is to supply missing numbers in addition sums. This again is complementary addition.

54	Adding from the top line down.
87	4, 11, 17 and 3 are 20.
26	2, 7, 15, 17 and 4 are 21.
	The missing number is 4 tens and 3 units,
—	i.e. 43
210	

The answer can be checked by writing in the missing number and adding to see if the total is correct.

15. Practice should also be given in sums of this type.

(*a*) What is the sum of seventy-seven, one hundred and nine, sixteen, and ninety-three?
(*b*) Add together: one less than one hundred and one less than one thousand
(*c*) Add together: half of one hundred, half of one thousand, and half of ten.

16. It is important that from the earliest stages children should learn to set out their work logically and clearly. They should be encouraged to write one or more suitable words opposite each line of the first simple sums. It will be a great help if the signs +, —, ×, ÷, =, are taught early.
In a garden were set 48 red roses, 36 yellow roses, and 54 white roses How many roses were there altogether?

	Roses
Red	48
Yellow	36
White	54
Total	138

Multiplication

Simple multiplication is a short way of adding when the addends are all equal. This should be clearly shown in all first teaching of the subject. Exercises at first may be worked both by addition and multiplication until the children see and understand the relationship between the two operations.

It is important when teaching a new rule to arouse the child's interest and curiosity by applying the rule to a problem within his own experience. In introducing multiplication the teacher may say, "There are 8 children in this group, and each has 5 coloured chalks. How shall we find out how many chalks there are altogether?" Someone will probably suggest writing 5 down 8 times and finding the sum; but the suggestion is sure to come that table knowledge should be used: $5 \times 8 = 40$.

Here we reach the crux in the teaching of multiplication,—tables must be taught thoroughly " It is scarcely possible to lay too much stress upon this,"—the learning by heart of tables

"The children should be able to answer without hesitation, whether they are asked what are seven 8s, how many 8s there are in 56 or what is the eighth part of 56." *Handbook of Suggestions.*

Speed and accuracy in multiplication depend entirely upon knowledge of the tables. The simple tables will have been built up with the help of apparatus, then written out, or printed on a card, and memorised by the children. Oral work in groups or classes, and constant revision are, however, needed for children to obtain readiness and facility There is bound to be a certain amount of drudgery in teaching tables, but no satisfactory results can be obtained in arithmetic unless this work is done thoroughly. It is a mistake to allow a class to repeat tables in the same way every day. Countless variations can be devised, and the children become amused and interested in these. The tables need not be taught in consecutive order from two to twelve. A convenient grouping in order of difficulty is as follows:

(*a*) Tens and fives.
(*b*) Twos, fours and eights.
(*c*) Threes, sixes, nines and twelves.
(*d*) Elevens and sevens.

The method of constructing tables by the repeated addition of a number will be quite clear to the children if they make their tables in this way:

One three is 3,
two threes are 6,
three threes are 9,

not

Three ones are 3,
three twos are 6,
three threes are 9.

Some of the devices in use by teachers for helping table work are given here.

1. Let the class or groups say even numbers only:

2 threes are 6,
4 threes are 12,
6 threes are 18.

Then follow this by saying odd numbers only.

3 threes are 9,
5 threes are 15,
7 threes are 21.

2. Have tables said backwards.

12 fours are 48,
11 fours are 44,
10 fours are 40.

3. Let the class count in twos, threes, fours, etc.:

   3, 6, 9, 12, etc.
   4, 8, 12, 16, etc.

4. Have numbers written on the blackboard:

   1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12,
   2
   3
   4
   5
   6
   7
   8
   9
   10
   11
   12

   Point to a number in the column, and then a number in the line, and require the class, a group, or an individual to give the product. E g. point to 6, then to 7, 6 sevens are 42.

5. Have a ring of numbers on the blackboard, point to one number, then to another, and ask for the product.

   2
   12 3
   11 4
   10 5
   9 6
   8 7

6. Have the products of a table written in any order on a large card on the blackboard. Then tell the class, or let them tell you, which table it is, and require them to give the correct factors

   This is the 6 *times table.*

   36 6 sixes are 36,
   54 9 sixes are 54,
   24 4 sixes are 24, etc.

   This method of saying tables is particularly useful when division is being taught, as is also the next method given.

7. Have the tables said for division

   In 10 there are 2 fives.
   In 15 there are 3 fives.
   In 20 there are 4 fives.

8. Sometimes allow the children to work in pairs or groups, and test each other orally

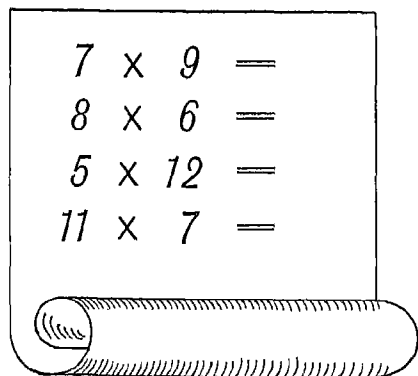
9. A number square containing the products of the tables 1×1 to 12×12, such as is found in many textbooks, may be constructed by the children, and various exercises in using it may be given.

Number Square

1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3	6	9	12	15	18	21	24	27	30	33	36
4	8	12	16	20	24	28	32	36	40	44	48
5	10	15	20	25	30	35	40	45	50	55	60
6	12	18	24	30	36	42	48	54	60	66	72
7	14	21	28	35	42	49	56	63	70	77	84
8	16	24	32	40	48	56	64	72	80	88	96
9	18	27	36	45	54	63	72	81	90	99	108
10	20	30	40	50	60	70	80	90	100	110	120
11	22	33	44	55	66	77	88	99	110	121	132
12	24	36	48	60	72	84	96	108	120	132	144

10. Practice may be given in resolving numbers from the multiplication table into pairs of factors. This forms a good revision of tables, and later may be extended to splitting numbers into prime factors.

11. A device which tests tables and which children find interesting is a long roll of paper with various table multiplications on it but with the products missing.

7 x 9 =
8 x 6 =
5 x 12 =
11 x 7 =

The teacher gradually unwinds the roll, and as each new line appears the children write down the product as quickly as they can When a certain number has been written, or when the whole roll is unwound, the teacher stops and the children mark each other's papers

12. Sometimes table practice should be given combined with other working.

Complete the statements:

$8 \times 8 + 3 =$
$9 \times 4 + 2 =$
$6 \times 7 + 5 =$

13. When a table is being learned, give many sums involving multiplication by that same unit.

14. When fractions have been taught a useful revision of tables can be taken by cancelling.

$$\frac{48}{54} = \frac{8}{9}$$
$$\frac{35}{40} = \frac{7}{8}$$

This is also useful later when the harder tables, 13, 14, 15, etc., are being taught $\frac{39}{52}$ should be recognised as $\frac{3}{4}$, and $\frac{106}{120}$ as $\frac{7}{8}$.

15. Table races may sometimes be given as tests. Give slips of paper, ask for a table to be written forwards or backwards, and give a special mark to the first ten finished and correct.

Short Multiplication

Short multiplication is usually set down as shown here, and seldom presents much difficulty if the tables are known Children should be able to multiply and add in the "carrying" figure without writing down each separate answer. Regular oral practice in 12, above, will help them to do this easily

```
267×8
  8
────
2136
```

Children should know the sign for multiplication, ×, and should know that the result obtained is the *product* of 267 and 8 If it is desired to let the children see exactly what they are doing the process may be written out in full.

Th	H.	T.	U.
	2	6	7 8
  1	 4 6	5 8	6
2	1	3	6

Some teachers advocate the writing of multiplication in this form·

$$5\times73 \qquad \begin{array}{r} 5 \\ 73 \\ \hline 365 \end{array}$$

The sum is worked by multiplying by the top number. This method is useful when long multiplication of money is being taught.

As in addition, so in multiplication, children should learn to check their answers, and to realise that a wrong result is worthless. It is possible to check by working over again in the same way, but unfortunately mistakes that were made the first time are likely to be repeated. When division is known, a better way to check multiplication is to divide the product by the multiplier. From the earliest stages, and even with the easiest sums, children should be taught checking. Multiplication by 10 should present no difficulty. Each figure is moved one place to the left and a nought is put in the units place. Practice should be given in multiplication by multiples of ten, i.e. 40, 60, 70, etc. as children are apt to forget how to do this

Factor Multiplication

Factor multiplication is a succession of short multiplications It is seldom used now with numbers, though it is sometimes useful in the multiplication of money, weights, lengths, etc. If used it may be set out as below:

$$\begin{array}{rl} 579\times27 & \\ 3 & \\ \hline 1737 & =3 \text{ times} \\ 9 & \\ \hline 15{,}633 & =9\times3=27 \text{ times.} \end{array}$$

Children should understand that it makes no difference to the answer whether we multiply by 3 first or 9 first.

$$7\times9=9\times7=3\times3\times7=3\times21.$$

The children should recognise that 7×9 is 7 taken 9 times, i.e 9 times 7, *not* 7 times 9.

(*a*) $7\times9=9$ times $7=63$
$9\times7=7$ times $9=63$
$\therefore\ 7\times9=9\times7.$

(*b*) $3\times4\times5=(4 \text{ times } 3)\times5$
$=12\times5$
$=60$
$3\times5\times4=15\times4=60$
$4\times5\times3=20\times3=60$
$5\times3\times4=15\times4=60$
$\therefore\ 3\times5\times4=4\times5\times3=5\times3\times4.$

Hence the value of the product does not depend on the order of the factors.

Compare $£4\times5=£4+£4+£4+£4+£4$, and the lack of meaning in $5\times£4$, which cannot be read as "5 times £4"

Long Multiplication

There are several ways of setting this out, but the method usually adopted is to multiply by the left-hand digit of the multiplier first. This gives a first approximation to the result, and is specially useful in multiplication of decimals.

Example.—497×68

```
   497  ×  68
    68
 ------
 29820
  3976
 ------
 33,796
```

There are many "short cut" devices in multiplication, but no attempt should be made to impress these upon young children, or children whose mentality does not allow them to deal adequately with the ordinary straightforward work of the class. Scholarship candidates, however, and the brighter of the under elevens, should have a knowledge of these "short cuts" and should be encouraged to invent similar methods for themselves.

1. Multiplication is sometimes simplified by subtraction.

(*a*) 9=10−1. Hence to multiply a number by 9, multiply it by 10, and subtract the number itself from the product.

$$\begin{aligned} 17{,}658\times 9 &= (17{,}658\times 10)-17{,}658 \\ &= 176{,}580-17{,}658 \\ &= 158{,}922 \end{aligned}$$

(*b*) 99=100−1. Hence to multiply a number by 99, multiply it by 100, and subtract the number itself from the product.

$$\begin{aligned} 5764\times 99 &= (5764\times 100)-5764 \\ &= 576{,}400-5764 \\ &= 570{,}636 \end{aligned}$$

(*c*) 999=1000−1. Hence to multiply a number by 999, multiply it by 1000, and subtract the number itself from the product.

$$\begin{aligned} 3758\times 999 &= (3758\times 1000)-3758 \\ &= 3{,}758{,}000-3758 \\ &= 3{,}754{,}242 \end{aligned}$$

(*d*) 98=100−2. Hence to multiply a number by 98, multiply it by 100, and subtract twice the number itself from the product.

$$\begin{aligned} 7893\times 98 &= (7893\times 100)-(7893\times 2) \\ &= 789{,}300-15{,}786 \\ &= 773{,}514 \end{aligned}$$

The method can be extended to multiplication by numbers like 97, 998, 997, 990, 9990

2. Multiplication can sometimes be made easier by simple division

(*a*) $25=\frac{100}{4}$ Hence to multiply by 25, multiply by 100, and divide the product by 4.

$$7639\times25=\frac{763,900}{4}=190,975$$

(*b*) $250=\frac{1000}{4}$. Hence to multiply by 250, multiply by 1000, and divide the product by 4.

$$5892\times250=\frac{5,892,000}{4}=1,473,000$$

(*c*) $125=\frac{1000}{8}$. Hence to multiply by 125, multiply by 1000, and divide the product by 8.

$$578\times125=\frac{578,000}{8}=72,250$$

(*d*) $3\frac{1}{3}=\frac{10}{3}$. Hence to multiply by $3\frac{1}{3}$, multiply by 10, and divide the product by 3

$$7629\times3\frac{1}{3}=\frac{76,290}{3}=25,430$$

(*e*) $33\frac{1}{3}=\frac{100}{3}$ Hence to multiply by $33\frac{1}{3}$, multiply by 100, and divide the product by 3.

$$2529\times33\frac{1}{3}=\frac{252,900}{3}=84,300$$

3. Multiplication by partial products often simplifies working. Examine the digits of the multiplier, and note if one digit is a factor or multiple of another, e g. multiplication by 63 requires multiplication by 3 and then the product of the multiplication by 3 to be multiplied by 20

```
  789×63
    3
 ------
   2367=3 times 789
  47340=3 times×20=60 times 789
 ------
 49,707=63 times 789
    2758×459
       9
 ---------
    24822=9 times 2758
  1241100=9 times×50=450 times 2758
 ---------
1,265,922=459 times 2758
```

With multipliers of 3 digits or more the work is considerably lessened by using this method Multiplication by 357, requires multiplication by 7 and by 5.
Examples may be taken making use of the facts:

$357=7+(7\times50)$
$819=9+(9\times90)$
$1089=9+(9\times120)$.

Children should be taught to use the easier multiplier in working a sum.

In 516×211, 211 is the easier multiplier.
In 217×468, 217 is the multiplier to use as $217=7\times(7\times30)$.
In 908×7859, 908 is the easier multiplier.
In 777×465, 777 is the easier multiplier, as there is actually only one line of multiplication to work.
In 6432×9593, 6432 is the easier multiplier.

An alternative method of working provides a useful check upon the answer to a multiplication sum.

Subtraction

Plenty of oral practice in subtraction should be given. The more of this the children do, the more accurate will they become. The sign for subtraction —, the word *minus*, and the word *difference*, should be carefully impressed upon the children.

1. Making the subtraction table, and testing from it thoroughly and frequently will be helpful The answers to such questions as "What is 9 from 14?" etc., should come automatically, and the aim should be to fix them in the child's mind.

Subtraction Table

18—9
17—9, 8
16—9, 8, 7
15—9, 8, 7, 6
14—9, 8, 7, 6, 5
13—9, 8, 7, 6, 5, 4
12—9, 8, 7, 6, 5, 4, 3
11—9, 8, 7, 6, 5, 4, 3, 2
10—9, 8, 7, 6, 5, 4, 3, 2, 1
9—9, 8, 7, 6, 5, 4, 3, 2, 1, 0
8—8, 7, 6, 5, 4, 3, 2, 1, 0
7—7, 6, 5, 4, 3, 2, 1, 0
6—6, 5, 4, 3, 2, 1, 0
5—5, 4, 3, 2, 1, 0
4—4, 3, 2, 1, 0
3—3, 2, 1, 0
2—2, 1, 0
1—1, 0

Table for Testing Subtraction

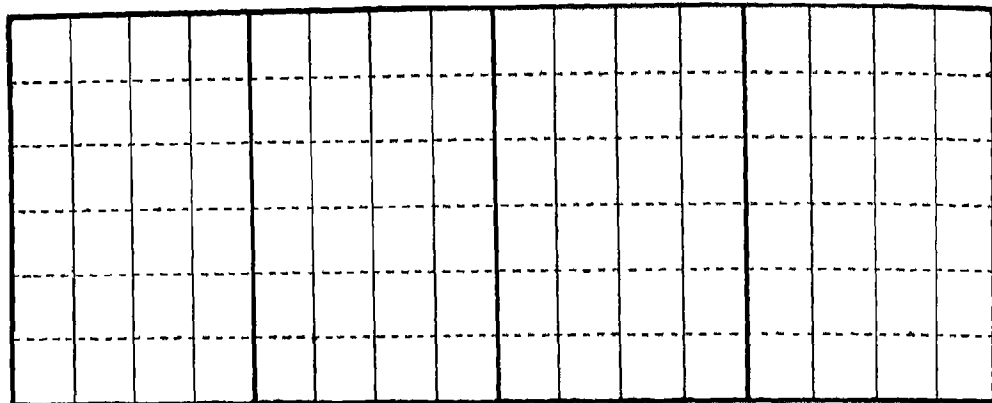
A.	B.	C.
Nines.	*Thirteens.*	*Seventeens*
1 and 8	3 and 10	7 and 10
3 ,, 6	7 ,, 6	3 ,, 14
2 ,, 7	8 ,, 5	12 ,, 5
4 ,, 5	5 ,, 8	5 ,, 12
6 ,, 3	6 ,, 7	11 ,, 6
5 ,, 4	9 ,, 4	9 ,, 8
Tens	*Fourteens.*	*Eighteens*
2 and 8	5 and 9	4 and 14
4 ,, 6	7 ,, 7	11 ,, 7
5 ,, 5	3 ,, 11	8 ,, 10
3 ,, 7	6 ,, 8	3 ,, 15
1 ,, 9	4 ,, 10	2 ,, 16
6 ,, 4	9 ,, 5	9 ,, 9
Elevens.	*Fifteens.*	*Nineteens.*
5 and 6	2 and 13	12 and 7
6 ,, 5	8 ,, 7	8 ,, 11
7 ,, 4	5 ,, 10	11 ,, 8
9 ,, 2	6 ,, 9	4 ,, 15
8 ,, 3	4 ,, 11	6 ,, 13
3 ,, 8	7 ,, 8	5 ,, 14
Twelves.	*Sixteens.*	*Twenties.*
6 and 6	5 and 11	3 and 17
3 ,, 9	9 ,, 7	5 ,, 15
1 ,, 11	7 ,, 9	8 ,, 12
7 ,, 5	4 ,, 12	7 ,, 13
5 ,, 7	8 ,, 8	4 ,, 16
4 ,, 8	6 ,, 10	6 ,, 14

A good way to use the testing table is to let children place a ruler over one column, and say, "What number must be subtracted from 15 to leave 9?" or, "What number must be added to 9 to give a sum of 15?" The children may work at this in pairs, one testing the other

2. Counting backwards from a certain number by equal subtractions is a useful form of oral work

(*a*) Begin at 100, count backwards taking away 3 each time,—100, 97, 94, 91, and so on.

(*b*) Begin at 95, count backwards taking away 4 each time,—95, 91, 87, and so on. Counting backwards can be done with any number as the starting point, and any number as the subtrahend.

Repeat with other numbers: 72÷18; 96÷16; 112÷14, and so on, and let the children suggest their own factors. Other illustrations can be made on a squared blackboard, or on squared paper.

Dividing by 4, there are 4 blocks of 24 squares (marked off by bold lines which may be coloured brown).
Dividing each of these blocks by 4 (by blue lines) there are 4 strips with 6 squares in each,—that is, 16 strips of 6 squares altogether.

3. The greatest difficulty in teaching division by factors is the remainder. The explanation seems simple, but children find it difficult to understand the rule and to apply it. Much practice is necessary before they acquire facility. If a full explanation of the rule is desired, recourse must again be had to grouping of objects or to diagrams.
In considering 76—18, children may work in pairs or in groups of three or four. Each group should have 76 sticks or beans. The 76 beans are first divided into 3 equal groups There are 3 groups of 25 beans, and 1 bean over. Now each of the 3 groups is to be divided into 6 equal groups. In each of the 3 groups there are 6 groups of 4, and 1 over. The 3 ones over from this grouping, and the 1 left over at the first grouping form the remainder 3+1 or 4, i e. 18 groups of 4, and rem 4.
This process can be repeated using 6 as the first factor. This will make the first remainder different and will give a little more practice in remainders.

4. Another illustration is afforded by paper-cutting.
Consider 84—15. Let each child cut out 2 rectangles each containing 84 squares.
The problem this time is to find how many groups of 15 squares are contained in 84 squares. One rectangle may be cut into blocks of 3 squares. There are 28 blocks of 3. These blocks of 3 are put together, pasted into a book 5 together, to form groups of 15. There are 5 groups of 15, and 3 groups of 3 remaining.
∴ the answer is 5 and rem 9.
This might have been considered the other way,—as the result of dividing 84 into 15 equal parts.

First divide the 84 squares into 3 equal blocks,—3 blocks of 28 squares,—then each of these blocks into 5 equal parts. There are then 15 parts with 5 squares in each, and 3 squares remaining from each of the 3 blocks of 28, i.e. 9 remaining
Explanations of this kind though interesting to the teacher are not essential to the child. It is not reasonable "to expect a child in the primary school to justify the process he employs" *Report of the Consultative Committee on the Primary School.*

5. Some teachers insist in factor division that the value of each line shall be clearly written.

3)139 units

6)46 groups of 3 and 1 unit over.

7 groups of 18 and 4 groups of 3 over
Remainder $=(3\times4)+1=13$.

Many teachers will prefer this method, using the idea of quotition, as the explanation of the remainder is not so cumbersome
The form of factor division which includes division by such numbers as 20, 30, 40, 200, 300, 400, etc., is most useful, and should be practised frequently.

Missing Number Sums

Missing number sums in division and multiplication usually interest children. They form a good exercise as they show how checking may be done.

Fill in the missing numbers in the following sums:

(*a*) ** × 5 = 75
(*b*) ** ÷ 12 = 8
(*c*) 108 — * = 12
(*d*) *** × 6 = 744
(*e*) 3)****
758 r. 1

(*f*) ***×4
4
2536

(*g*) $\frac{1}{*}$ of 60 = 12

(*h*) $\frac{1}{*}$ of 84 = 12

Long Division

Most of the difficulty of teaching this process formerly arose from the attempt to teach it too soon. The principle is the same as that in short division, and when considering short division we noted that every division sum could be set out in the long method if desired. Children frequently find difficulty in deciding the place value of the figures of the quotient.

Much of this difficulty is eliminated if children are taught to put the quotient over the dividend. The first figure of the quotient must be placed correctly. To ensure this, some teachers allow children to put dots over the first figures of the dividend into which the divisor will not "go," and then insist that after the dots each figure of the dividend must have a quotient figure over it. Most teachers know how such answers as 160, and 106, are given by some children as 16.

```
  ··409 r. 23          ·120 r. 25
  ------               ------
41)16792             31)3745
   164                  31
   ------               ----
     392                 64
     369                 62
     ---                 ---
      23                  25
```

The first sums must be carefully graded in difficulty. Divisors near an exact number of tens should be chosen, and sums requiring noughts in the quotient should at first be avoided.

Most teachers have little devices of their own for helping the children to determine the quotient figure

(*a*) In the example 267÷31,—one way is to try the first figure of the divisor into the first figure or the first two figures of the dividend, i.e. 26÷3=8. Then the first quotient figure is probably 8. Should 8 times 31 be too much, then it will be 7 times or some lower number.

(*b*) Another way is to make the children base their work on the limits of the exact tens between which the divisor lies.

For example, in 267÷54,—the divisor lies between 50 and 60, so that the quotient is either 26÷5, i.e. **5**, or 26÷6, i.e. **4**. Having determined this, the child will be able by a mental trial to discover the exact figure

A good way to grade first examples is as follows:

1. The quotient should contain one figure only, and that should be the expected one
2. The quotient should contain one figure only, and that not always the expected one.
3. The quotient should contain two figures, but neither should give any difficulty.
4. The quotient should contain two figures, and one should be the unexpected.
5. The quotient should contain three figures, all easy.
6. The quotient should contain three figures, the middle one a nought.
7. The quotient should contain three figures, the last one a nought.
8. The quotients should vary, and harder examples be given.

COMPOUND RULES

When practice is being given in the simple rules many easy examples can be given, which prepare the way for money sums and the compound rules generally.

Examples

1. There are 12 pence in 1 shilling. How many pence are in 5s ? 7s ? 11s ?
2. There are 16 oz. in 1 lb. How many oz. are in 3 lb ? 5 lb.? 8 lb.?
3. There are 7 days in a week How many days are in 8 weeks? 13 weeks? 24 weeks?
4. There are 4 farthings in a penny How many pennies are in 92 farthings?
5. There are 3 ft. in 1 yd How many yd. are in 84 ft ?
6. There are 8 pints in a gallon How many gallons are in 584 pints?

Money

Money sums are bound to occupy an important place in the arithmetic scheme, for money occupies a most important place in everyday life. Even adults who come to the British Isles from a country with a simple decimal coinage find great difficulty in mastering the connections between the numerous coins in common use here. In fact many foreigners never do master the intricacies of our coinage. Therefore little need be said about this system to teachers who know what hours of labour must be spent in teaching its complexities to children. There are some people who, because of the difficulties of long multiplication and division of money, advise leaving the teaching of these rules until decimalisation of money has been learnt. Then, when money can be decimalised readily, long multiplication and division can be worked with far less trouble. Most teachers, however, follow the traditional method, and when the simple rules have been taught continue with the four rules applied to money Children become familiar with money,—farthings, halfpennies and pennies,—when they are very young In poorer families quite small children do shopping errands for their own family and for neighbours, and some young children have a remarkable knowledge of the spending power of the halfpenny or penny which rewards their errands. Knowledge of money is extended in the infant school by the use of cardboard coins, shopping exercises and games, giving change, etc., so that by the time the age of seven plus is reached there is a definite basis upon which to work.

Money tables must be learnt thoroughly to a certain point A perfect knowledge of the 4 times table, and the 12 times table make it unnecessary to learn by heart the reduction of all farthings up to 48 farthings, or all pence to 240 pence The traditional pence table, (18d , 20d , 24d , 30d., 36d., etc.), is familiar to all teachers, and is usually memorised by constant repetition and tests The pence table of course should not be attempted until the 12 times table is known perfectly There are a few variations which will aid in the memorizing of the pence table.

1. Let the table be said in this way

12d =1s.,
22d.=1s. 10d.,
32d.=2s. 8d.,
42d.=3s. 6d ,—and so on.
Or choosing another starting point:
15d.=1s. 3d.,
25d =2s 1d.,
35d =2s 11d ,
45d.=3s. 9d ,—and so on.

2. Combine the pence table with multiplication tables:

4×3=12; 12d. are 1s.,
5×3=15, 15d are 1s. 3d.,
6×3=18; 18d. are 1s. 6d.,
7×3=21; 21d. are 1s. 9d.,—and so on.
2×7=14; 14d. are 1s. 2d.,
3×7=21, 21d. are 1s. 9d.,
4×7=28; 28d. are 2s. 4d.,
5×7=35; 35d. are 2s. 11d.,—and so on.

3. Reverse the usual order and say:

1s. 1d. is 13d.,
2s. 1d. is 25d.,
3s. 1d. is 37d.,
4s 1d. is 49d.,—and so on.
1s. 3d. is 15d.,
2s. 3d. is 27d ,
3s 3d is 39d.,
4s. 3d. is 51d.,—and so on.

4. Counting backwards in twopences, threepences, fourpences, etc., from some stated amount is a useful exercise, as it combines subtraction with table knowledge:

100d =8s. 4d.,
98d.=8s. 2d.,
96d.=8s.,
94d.=7s. 10d.,—and so on.
144d.=12s.,
141d.=11s. 9d.,
138d.=11s. 6d.,
135d.=11s. 3d.,—and so on.
Or reverse the order and say:
10s =120d.,
9s. 8d.=116d ,
9s. 4d.=112d.,
9s.=108d.,—and so on.

It is not advisable to have these exercises said aloud by the whole class, except occasionally. There are bound to be some children quicker and more zealous than others. These do the work, and the slower ones and lazy ones are "passengers." It is, however, undoubtedly true that slow and earnest children who wish to learn, do learn a great deal from the quicker children in oral repetition Group work with six, four or even two children in a group, is a way of making everyone work. Another good way of making certain that each child does his share is to give slips of paper to the class, and have the exercise written quickly in pencil, and corrected as various children read aloud what they have written Most teachers have their own "pet" devices for this kind of work

Children should understand the meaning of the signs £ s d.

> £ signifies pounds in money, *L* being the first letter of the Latin word *Librae* meaning pounds.
>
> *s.* signifies shillings, *s* being the first letter of the Latin word *solidi*, meaning shillings.
>
> *d.* signifies pence, *d* being the first letter of the Latin word *denarii*, meaning pence.

Reduction

Plenty of oral work of a simple type should be given

1. How many halfpence are in 3½d ? 4½d.? 6½d.?
2. How many farthings are in 2¼d.? 3¾d.? 7½d ?
3. How many pence are in 1s. 4d.? 2s 10d ? 3s. 2d.?
4. How many shillings are in £2 4s.? £3 11s ? £4 15s.?
5. How much is 17 farthings? 21 farthings? 33 farthings?
6. How much is 11 halfpence? 18 halfpence? 23 halfpence?
7. How much is 22d ? 35d ? 44d.? 52d.?
8. How much is 33s.? 45s.? 59s.? 64s.?
9. How many oranges at 1d. each can be bought for 1s. 3d.? 2s 8d.? 4s 10d.?
10. Mother bought 20 pegs at ½d. each. How much did she pay for them?
11. How many chocolate biscuits at 2d. each can be bought for 2s.? 3s. 4d.? 7s 6d.?
12. What was paid for 15 cards at 2d. each?
13. Find the cost of 7 lb of apples at 4d per lb.
14. Find the cost of 9 threepenny pencils
15. What was the cost of 3 doz. indiarubbers at ½d. each?
16. There are 50 girls in the class What would it cost to give each a shilling book?
17. £3 15s. was taken for concert tickets at 1s each How many tickets were sold?
18. John saved 62 shillings. How many pounds had he?
19. How many films at 1s. each had been sold from a machine when it contained £2 14s ?
20. A boy's bus fare was 6d. per day. What was the cost for 31 days?

The exercises should be made more difficult as the children's facility in working them increases

Long reduction sums are unreal and unnecessary. "Reduction need never include more than three consecutive units—pounds, shillings, pence; yards, feet, inches, gallons, quarts, pints—and should take two forms (*a*) reducing from larger units to smaller (Reduce £2 11s. 6d to sixpences) and (*b*) expressing smaller units as a fraction of a larger unit. (Express 11s. 6d. as a fraction of £1.)" *Report on the Primary School*

At first simple examples which require only one change of denomination should be given.

1. How many pence are in 8s 10d ? 14s 11d.? 18s. 6d.?
2. How many halfpennies are in 6½d ? 2s 10d.? 6s. 6d ?
3. Express in shillings £2 15s., £4 11s , £5 17s.
4. Express in farthings 10½d , 1s 3¼d., 2s 5¾d
5. Express as s d 113d.; 198d., 237d.
6. Express as s. d. 112 halfpence, 213 halfpence, 349 halfpence.

There are two main ways of arranging reduction,—the traditional method, and the column method.

Example: Change £12 16s. 3d. to pence.

Traditional Method

```
 £  s.  d.
 12 16  3
 20
-----
 256s.
  12
-----
3075d.
```

This is sometimes shortened by omitting the multipliers:

```
 £  s.  d.
 12 16  3
-----
 256s.
-----
3075d.
```

Column Method

```
£      s.      d.
12     16       3
       240   3072
       ---   ----
       256   3075
```

Reduction upwards can also be arranged in two ways.

Example Change 6854 pence to £ s. d.

Traditional Method

```
  pence
12)6854
   ----
 20)571s. 2d.
    ---
   £28 11s. 2d.
```

This is sometimes shortened by omitting the divisors

```
6854d.
 571s. 2d.
£28  11s.  2d.
```

Column Method

```
£     s.     d.
28   571   6854
---------------
28    11      2
```

Working 6854d. = 571s 2d.
571s. = £28 11s

This is not as straightforward an arrangement as the traditional method, but is a little clearer if the lines of working are set out as below:

£	s.	d.
		6854
	571	2
28	11	2

When the reduction of pounds, shillings, pence, halfpence and farthings has been taught, there are threehalfpences, twopences, threepences, fourpences, sixpences, florins and half crowns to be tackled. As a rule, once the other work has been done thoroughly, these do not present much difficulty. Reduction to twopences, threehalfpences, fourpences and sixpences follows quite naturally after reduction to shillings. Children should be able to count in halfcrowns to £1, and in threehalfpences to 1s. It is a good idea to have tables of halfcrowns and threehalfpences made by the children:

I.
1 halfcrown is 2s. 6d.
2 halfcrowns are 5s. 0d.
3 halfcrowns are 7s 6d.
4 halfcrowns are 10s. 0d.
5 halfcrowns are 12s 6d.
6 halfcrowns are 15s. 0d.
7 halfcrowns are 17s. 6d.
8 halfcrowns are £1.

II.
2 threehalfpences are 3d.
3 threehalfpences are 4½d.
4 threehalfpences are 6d.
5 threehalfpences are 7½d.
6 threehalfpences are 9d.
7 threehalfpences are 10½d.
8 threehalfpences are 1s.

There are certain other facts which each child should discover and memorise:

III.
240d. = £1.
480 halfpence = £1.
960 farthings = £1.
40 sixpences = £1.
80 threepences = £1.
120 twopences = £1.
60 fourpences = £1.

24 halfpence = 1s
48 farthings = 1s.

Give frequent oral work until these facts are well known.

1. What is the cost of 240 pens at 1d. each? 2d. each?
2. What is the cost of 240 pencils at 3d. each? 4d. each?
3. What is the cost of 240 brushes at 4½d. each? 5½d each?
4. Find the cost of 480 halfpenny bars of toffee.

5. What would it cost to buy 480 penny oranges?
6. How much would 480 threehalfpenny stamps cost?
7. Find the cost of 960 pegs at ¼d. each.
8. What is the cost of 960 reels of cotton at 1¼d per reel?
9. Find the cost of 960 yd. at 1½d. per yd.; 2¼d. per yd ; 2¾d. per yd.
10. What did 40 books at 6d each cost?
11. Find the cost of 40 paint boxes at 1s. 6d. each.
12. How much would 80 threepenny tram tickets cost?
13. A box containing 40 lb of apples cost £1. What was the price per lb. of the apples?
14. Find the cost of 16 eggcups at 1½d. each. 24 cups at 4d. each. 19 glass dishes at 3d. each.
15. How many buttons at 1½d. each can be bought for 2s. 6d.? 3s. 3d.? 4s.?
16. How many threepenny bars of chocolate can be bought for 3s. 9d.? 4s. 6d.? 5s. 3d ?
17. A roll contained 30 yd. of ribbon worth 4d per yd. What was the value of the roll?
18. A stamp book contained eighteen 1½d. stamps, six 1d. stamps, six ½d. stamps. What was the value of the book?
19. How many lemons at 2 for 1½d. cost 1s 6d.? 2s. 6d.? 4s.?
20. How many oranges at 4 for 3d. can be bought for 2s.? 3s. 6d.? 5s ?
21. Express in pounds and shillings: 16 halfcrowns; 18 halfcrowns; 20 halfcrowns, 26 halfcrowns.
22. Express in halfcrowns: £1 5s.; £2 15s.; £3 12s. 6d.; £4 10s.
23. Express in florins: 18s.; £1 8s ; £2 14s.; £3 10s
24. Express as sixpences: 4s.; 7s 6d.; £1, 13s. 6d.; 17s. 6d.
25. How many times is 2s. contained in £2 18s.? 2s. 6d. contained in £3 15s.? 6d. contained in 12s. 6d.?
26. What is the difference in value between 1 florin and 1 halfcrown? between 7 florins and 7 halfcrowns? between 15 florins and 15 halfcrowns?
27. What is the difference in value between ¼d. and ½d.? between 16 farthings and 16 halfpence? between 30 farthings and 30 halfpence?
28. What is the difference in the cost of 30 marrows at 3d. each, and 30 at 4d. each?

If mental work of this type suited to the age and ability of the class is given frequently, the children will soon gain facility in dealing with money.

There are various practical short cuts which could quite well be taught here as they depend upon reduction.

I. 12 pence = 1 shilling.

12 articles (or 1 dozen) at 1d. each cost 1s., at 2d. each cost 2s., at 3d each cost 3s., etc.
1 doz at ½d. each cost 6d.
1 doz. at ¼d. each cost 3d.
1 doz. at ¾d. each cost 9d.
1 doz. at 1½d. each cost 1s. 6d.
1 doz. at 2¼d. each cost 2s. 3d.
1 doz. at 3¾d each cost 3s. 9d.
The converse is equally useful.
If 1 dozen cost 2s. 6d. 1 costs 2½d
If 1 dozen cost 4s. 9d. 1 costs 4¾d.

II. 20s. = £1.

20 articles (or 1 score) at 1s. each cost £1, at 2s. each cost £2, at 3s each cost £3.
1 score at 3d each cost 5s.
1 score at 6d each cost 10s
1 score at 9d. each cost 15s.
1 score at 2s. 3d. each cost £2 5s.
1 score at 3s. 6d. each cost £3 10s.
1 score at 4s. 9d each cost £4 15s.

The converse also applies.

If 20 or 1 score cost £3 10s. then 1 costs 3s 6d.
If 20 or 1 score cost £6 15s. then 1 costs 6s. 9d.

Later, when tons and cwt are familiar, this short cut should be applied to giving the price per ton from the price per cwt.

If 1 cwt. costs 2s. 3d. then 1 ton costs £2 5s.
If 1 cwt. costs 1s. 9d. then 1 ton costs £1 15s.
If 1 ton costs £2 10s. then 1 cwt. costs 2s. 6d.
If 1 ton costs £1 5s. then 1 cwt. costs 1s. 3d.

III. 10s = $\frac{1}{2}$ of £1.
∴ 6 articles at 10s. each cost $\frac{1}{2}$ of £6 (£3).
∴ 8 articles at 10s. each cost $\frac{1}{2}$ of £8 (£4).
∴ 17 articles at 10s. each cost $\frac{1}{2}$ of £17 (£8 10s)

IV. 5s. = $\frac{1}{4}$ of £1.
∴ 4 articles at 5s. each cost $\frac{1}{4}$ of £4 (£1).
∴ 9 articles at 5s. each cost $\frac{1}{4}$ of £9 (£2 5s)
∴ 14 articles at 5s. each cost $\frac{1}{4}$ of £14 (£3 10s.).

There are similar short cuts for reckoning costs at other fractions of £1 each; e g. 2s. 6d or £$\frac{1}{8}$; 6s. 8d. or £$\frac{1}{3}$; 3s 4d. or £$\frac{1}{6}$; 4s. or £$\frac{1}{5}$,—and so on.

V. There are 240 pence in £1.
∴ 240 articles at 1d. each cost £1.
∴ 240 articles at 2d. each cost £2.
∴ 240 articles at 3$\frac{1}{2}$d. each cost £3 10s.
∴ 240 articles at 4$\frac{1}{4}$d. each cost £4 5s

VI. There are 480 halfpence in £1.
∴ 480 articles at $\frac{1}{2}$d. each cost £1.
∴ 480 articles at 1d. each cost £2.
∴ 480 articles at 2$\frac{1}{2}$d. each cost £5.
∴ 480 articles at 4$\frac{1}{2}$d. each cost £9.

VII. There are 960 farthings in £1.
∴ 960 articles at $\frac{1}{4}$d. each cost £1.
∴ 960 articles at $\frac{1}{2}$d. each cost £2.
∴ 960 articles at $\frac{3}{4}$d. each cost £3.
∴ 960 articles at 2$\frac{1}{4}$d. each cost £9.

These short cuts are valuable and should be practised systematically or they will soon be forgotten. It is a good plan to put several examples of this type into the weekly speed and accuracy paper The ideal way is for the child to discover such short cuts for himself. Unfortunately the size of classes and the amount of work to be done in a short time in the classroom to-day do not allow much scope for individual discoveries. However, moments of joy attending such discoveries do occasionally come to the child and the teacher

Addition of Money

This is a purely mechanical art and requires much practice before quick and accurate work becomes a habit. Regular oral work will do much to form this habit

1. Add together 4d., 5d. and 8d ; 6d , 7d. and 5d
2. Find the sum of 8d and 9d ; 7d. and 11d, 10d. and 1s. 3d.; 4d., 9d. and 11d ; 7d., 10d. and 5d.
3. What is 8d. plus 1s. 8d.? 1s. 5d. plus 1s. 6d.? 2s. 3d. plus 1s 10d.? 2s. 7d. plus 1s. 6d ?
4. John had 9d. and Bill had 5d. more. How much had Bill?
5. I bought a humming top at 1s. 3d., and a rubber duck at 11d. How much did I spend?
6. Tom had a shilling and a halfcrown How much had he?
7. Lily had a shilling, a florin and a halfcrown How much had she?
8. In a purse were 4 pennies, a sixpence, a florin, and a halfcrown. What was the total in the purse?
9. Father paid 1s. 11d. for some socks, and had 7d left How much had he at first?
10. After spending 3s. 9d , I had 1s. 3d left. How much had I at first?
11. Alice had 4d. and Molly had 5d. more. How much had they together?
12. A hoop cost 10d., and a ball cost 6d. more. What was the cost of the two together?
13. Find the value of 6d.+3¾d +2½d.; 9¼d.+1½d.+3¾d ; 8¼d.+7¼d.+9½d.; 1s. 8d.+10d.+6d.; 1s. 2d.+1s. 9d.+7d.
14. My bill came to 3s. 4½d The grocer gave me 1s. 7½d. change. What had I given him?
15. Total this bill tooth paste 1s. 3d , soap 1s. 10d ; cod-liver oil 3s. 6d.
16. Beginning at (*a*) 1s , (*b*) 1s. 5d , count in twopences to £1.
17. Beginning at (*a*) 1s., (*b*) 1s 4d , (*c*) 1s. 8d , count in threepences to £1
18. Beginning at (*a*) 6d., (*b*) 8d., (*c*) 11d , count in sixpences to £1.

A simple and effective way of giving practice in addition is to allow children to make ready reckoners. These can be made in a small notebook kept specially for the purpose, and can be added to each week, or they can be made on loose sheets and kept in a folder for future reference.

Have 4 or more columns, as desired, ruled on the page, and have 12 or 20 lines in each column. Show the children how to begin Then let them complete the work by themselves, afterwards checking the result. The reckoner shown below is for 2½d. and ranges from one 2½d. to eighty times 2½d. A similar reckoner can be made for any amount.

A Simple Ready Reckoner

	s.	d		s.	d.		s	d.		s	d.
1.		2½	21.	4	4½	41.	8	6½	61.	12	8½
2		5	22.	4	7	42.	8	9	62.	12	11
3.		7½	23	4	9½	43	8	11½	63.	13	1½
4		10	24.	5	0	44	9	2	64	13	4
5.	1	0½	25	5	2½	45.	9	4½	65	13	6½
6.	1	3	26	5	5	46.	9	7	66	13	9
7.	1	5½	27.	5	7½	47	9	9½	67	13	11½
8.	1	8	28	5	10	48	10	0	68.	14	2
9.	1	10½	29	6	0½	49.	10	2½	69.	14	4½
10.	2	1	30.	6	3	50	10	5	70	14	7
11.	2	3½	31	6	5½	51.	10	7½	71	14	9½
12	2	6	32	6	8	52	10	10	72	15	0
13	2	8½	33.	6	10½	53.	11	0½	73	15	2½
14.	2	11	34	7	1	54.	11	3	74.	15	5
15.	3	1½	35.	7	3½	55.	11	5½	75	15	7½
16.	3	4	36.	7	6	56	11	8	76	15	10
17.	3	6½	37	7	8½	57.	11	10½	77	16	0½
18	3	9	38	7	11	58	12	1	78	16	3
19	3	11½	39.	8	1½	59.	12	3½	79	16	5½
20.	4	2	40	8	4	60	12	6	80	16	8

At any time when it is felt that practice in rapid addition is needed, another page can be added to the ready reckoner.

There are two methods of working in common use for addition of money

Example:

£	s.	d.
12	6	8¾
3	15	9½
45	8	4¼
29	17	11¾
91	8	10¼

I. Add the farthings as numbers· 3, 4, 6, 9—9 farthings=2¼. Write ¼d , carry 2d. Add the pence as numbers: 2, 13, 17, 26, 34—34 pence=2s. 10d. Write 10d , carry 2s. Add the shillings as numbers: 2, 9, 17, 22, 28, 38, 48—48s =£2 8s. Write 8s., carry £2. Work the addition of pounds as ordinary addition of numbers.
The reduction from one denomination to another should be done mentally. A bad habit is formed when children are allowed to rely too much upon written work.

II. Add as farthings, completing the pence in the process ¾d , 1d., 1½d., 2¼d. Write ¼d., carry 2d Add as pence, completing the shillings in the process: 2d , 1s. 1d , 1s. 5d , 2s. 2d , 2s. 10d Write 10d , carry 2s Add as shillings, completing the pounds in the process: 2s , 19s , £1 7s., £2 2s , £2 8s Write 8s. Carry £2. Add the pounds.

In adding the shillings column this method is decidedly slower for children than the addition of numbers. A way adopted by some teachers is to add the units figures of the shillings. 2, 9, 17, 22, 28. 28s.=£1 8s. Write down 8s., then add up the tens to complete pounds.

Some teachers use method I, some method II Many teachers assert that method II. is more difficult. The child, having been trained to add on a system of completing tens, finds it difficult to change to one which requires the completing of twelves. Most adults use both methods, one method serving to check the other, and children might quite well be taught to do the same.

In a long addition the carrying figures may be written down, as they form a useful help in checking Any ordinary child can become quick and accurate at addition if regular practice is given and checking is insisted upon. Practice should be given in horizontal addition of money, as this is frequently necessary in after school life. Most teachers are familiar with the rows and columns arrangement of addition,—long "tots" and cross "tots." The examples given should be very carefully graded, the difficulties should be increased gradually, and the concrete examples should be of the type met with in daily life. Bills provide a useful exercise. Those given at first should require addition only; later, examples may be included requiring multiplication and division also.

SUBTRACTION OF MONEY

Oral Work

1. To make 1s. what must be added to 3d.? 8d.? 5d? 7d.? 4½d? 8½d? 2½d? 9½d.?

2. To make 2s. what must be added to 1s 4d.? 1s. 7d? 1s. 10d.? 11d.? 9d.? 4½d.? 8¼d? 1s 1½d?

3. To make 2s. 6d. what must be added to 2s 2d? 1s. 11d.? 1s. 8d.? 8d? 4d.? 1s. 10½d.? 1s. 3¼d.? 5¾d.?

4. To make 5s. what must be added to 4s 8d? 3s 6d.? 2s. 4d.? 1s. 5d.? 4s. 3¼d.? 3s 5½d? 2s 9¾d? 1s 11½d?

5. To make 10s. what must be added to 8s. 8d? 6s. 5d? 3s. 9d.? 1s 1d.? 7s. 11½d? 5s. 6¾d.? 4s. 3¼d.? 1s. 11½d.?

6. To make £1 what must be added to 17s 6d? 15s. 9d.? 13s. 3d.? 11s 8d? 8s 10d.? 7s 2d.? 5s 5d? 2s. 11d.? 1s. 1d.? 16s. 8½d.? 11s 4¼d? 4s. 3¾d.?

7. Find the difference between 4d. and 1s; 7d. and 1s. 3d; 11d and 2s. 6d; 2s. 2d. and 5s; 3s. 9d. and 5s.; 4s. 11d. and 6s.; 5s 7d and 7s. 6d, 6s. 11d. and 10s

8. How much less than 1s. is 3d? 7d.? 4½d.? 8½d.? 3¾d.? 9½d.?

9. How much less than 2s. 6d. is 2s. 3d.? 1s. 10d.? 1s 7d? 11d.? 9d.? 2s. 1½d.? 1s. 10½d? 1s. 6¼d.? 1s. 3¾d.? 11¾d.?

10. How much must be taken from 1s 6d. to leave 8d.? from 2s. to leave 1s 3½d.? from 5s. to leave 2s. 9d.? from 10s. to leave 4s. 4½d.? from £1 to leave 13s. 6d?

11. What change shall I have from 2s. after paying 1s 2d.? 11d.? 7½d.? 3¼d.? 2¾d.? 1s. 1½d.?

12. How much more than 3s 6d is 10s.? than 2s. 6d is 6s? than 2s. 9d. is 5s.? than 5s. 7d. is 10s.?

13. A knife and a top cost 1s. 9d. If the top cost 10d, what was the cost of the knife?

14. A book and a doll cost 5s 5d. If the book cost 3s 6d, what was the cost of the doll?
15. After spending 2d, 5d., and 9d., what should I have left from half a crown?
16. After spending 2s. 6d. and 1s. 3d., what should I have left from 10s.?
17. What is 5s. minus 1s. 7d.? 10s. minus 3s. 11d.? £1 minus 16s. 8d? 2s. 6d minus 6½d? 5s. minus 2s 11½d.? 10s minus 4s. 6½d.?
18. A man sold a camera which cost 4s. 6d. for 5s. 3d. How much profit did he make?
19. A box of paints and 2 painting books cost 4s. 2d. The paints cost 2s 6d. What was the cost of 1 book.
20. A collar and two ties cost 6s. 6d The collar cost 1s 6d. What was the cost of 1 tie?

Exercises such as counting backwards in twopences, threepences, fourpences from some given amount are also good practice; e g

Take 2d. continuously from 5s.
Take 3d. continuously from 10s.
Take 6d continuously from 10s.

Subtraction Table

1s. A.

	2½d	and	9½d.
	4½d	,,	7½d
	8½d.	,,	3½d.
	1¾d	,,	10¼d.
	3¾d	,,	8¼d.
	7¾d	,,	4¼d.
	6¼d	,,	5¾d.
	10¼d	,,	1¾d.

2s.

	2½d	and	1s	9½d.
	5½d	,,	1s.	6½d.
	7½d.	,,	1s.	4½d
	4¼d	,,	1s.	7¾d
	9¼d	,,	1s	2¾d.
1s.	1¾d	,,		10¼d.
1s.	4¾d.	,,		7¼d
1s	8¾d.	,,		3¼d.

2s. 6d.

	1¾d	and	2s.	4¼d
	3½d.	,,	2s.	2½d.
	7¼d.	,,	1s	10¾d.
	9½d.	,,	1s	8½d
	11¾d	,,	1s.	6¼d.
1s	1½d	,,	1s	4½d.
1s	6½d.	,,		11½d
1s	8¼d	,,		9¾d
2s	2¾d	,,		3¼d.

5s. B.

2s	7½d	and	2s	4½d
2s.	9¼d	,,	2s.	2¾d.
2s	11¾d.	,,	2s	0¼d
3s.	2½d	,,	1s.	9½d
3s.	7¼d.	,,	1s	4¾d
3s.	10¾d	,,	1s.	1¼d.
4s	4½d	,,		7½d.
4s	8¾d.	,,		3¼d

7s. 6d.

5s	1½d.	and	2s	4½d
5s	3¾d	,,	2s	2¼d.
5s	6¼d	,,	1s.	11¾d.
5s.	8½d	,,	1s	9½d
5s.	10¼d	,,	1s.	7¾d
6s	0¾d.	,,	1s	5¼d.
6s.	4½d	,,	1s	1½d.
6s.	7¼d	,,		10¾d.

15s.

12s	8¾d	and	2s.	3¼d.
13s	1½d	,,	1s.	10½d
13s.	3¼d	,,	1s	8¾d
13s	5¾d	,,	1s	6¼d.
13s	9½d	,,	1s.	2½d
14s	1¾d.	,,		10¼d.
14s	4½d.	,,		7½d
14s.	7¼d	,,		4¾d.
14s	10½d.	,,		1¼d.

10s. C.

2s	3d	and	7s	9d
4s	5d.	,,	5s	7d.
6s	11d	,,	3s	1d
1s	8¼d.	,,	8s	3¾d.
2s.	10½d.	,,	7s.	1½d.
3s	3¾d	,,	6s	8¼d.
4s	7½d.	,,	5s	4½d.
5s.	9¾d	,,	4s	2¼d.
6s.	2¼d	,,	3s.	9¾d.
7s	5½d.	,,	2s.	6½d.
8s	4¾d.	,,	1s	7¼d.
8s	11½d	,,	1s	0½d
9s	6¼d.	,,		5¾d.

£1

1s	8d.	and	18s.	4d.
3s.	5d.	,,	16s	7d
5s	10d.	,,	14s	2d
2s.	9½d	,,	17s	2½d.
4s.	4¾d	,,	15s.	7¼d.
6s.	7½d	,,	13s.	4½d.
8s	2¾d	,,	11s	9¼d
11s.	5½d	,,	8s	6½d
12s.	6¾d	,,	7s	5¼d
14s	1¼d	,,	5s.	10¾d
16s	9¾d	,,	3s	2¼d
17s.	3½d	,,	2s	8½d
18s.	0½d.	,,	1s.	11½d.

A useful wall sheet for practising subtraction or complementary addition can be made from the above table. The amount from which the subtractions are to be made, or which is to be made by complementary addition, is written at the top of the column. On the wall sheet or blackboard write the figures in one column only, and leave the other blank for the complementary amount. As the teacher points to an amount the children give the result of its subtraction from the amount at the head of the column, or the sum which will make it up to the amount at the head of the column. If preferred, the whole class may write the answers in their books to twenty or more such questions given rapidly. In this way frequent practice in subtraction can be given, and need occupy only a few minutes of a lesson.

Any of the methods of subtraction discussed previously may be used for subtraction of money. In shopping transactions in every-day life the method of giving change is always that of complementary addition. In fact this method is sometimes termed the "shop method." The number of teachers using it is increasing.

I. Equal Additions

£	s.	d.		£	s.	d.	d
16	6	$8\frac{1}{2}$	is actually	16	26	20	$1\frac{1}{2}$
5	15	$10\frac{3}{4}$	worked as	6	16	11	$\frac{3}{4}$
10	10	$9\frac{3}{4}$		10	10	9	$\frac{3}{4}$

Farthings:—$\frac{3}{4}$d from $\frac{1}{2}$d. "we cannot"; add 1d. $\frac{3}{4}$d. from $1\frac{1}{2}$d leaves **$\frac{3}{4}$d.**

Pence:—As we added 1d. to the top line we must now add 1d to the second line. 1d. and 10d is 11d; 11d. from 8d "we cannot" Add 1s., 11d from 1s. leaves 1d., and 8d. is **9d.**

Shillings:—As we added 1s. to the top line we must now add 1s. to the second line 1s. and 15s. is 16s.; 16s from 6s. "we cannot"; add £1, 16s from £1 is 4s, and 6s. is **10s.**

Pounds:—As we added £1 to the top line we must now add £1 to the second line. £1 and £5 is £6; £6 from £16 is **£10.**

II. Complementary Addition

£16 6s. $8\frac{1}{2}$d —£5 15s $10\frac{3}{4}$d.

£	s.	d.
16	6	$8\frac{1}{2}$
5	15	$10\frac{3}{4}$
10	10	$9\frac{3}{4}$

The question is considered in this form:

"What must be added to £5 15s. $10\frac{3}{4}$d. to make £16 6s. $8\frac{1}{2}$d.?"

Farthings—$\frac{3}{4}$d and **$\frac{3}{4}$d** make $1\frac{1}{2}$d. (Figures in heavy type are those to be written into the answer.) Carry 1d. as in addition

Pence:—1d. and 10d is 11d, and **9d.** is 1s 8d. Carry 1s.

Shillings:—1s. and 15s is 16s, and **10s.** is £1 6s Carry £1.

Pounds—£1 and £5 is £6, and **£10** is £16.

When this method becomes habitual, all that the child says is.

$\frac{3}{4}$d and **$\frac{3}{4}$d.** = 1$\frac{1}{2}$d.
11d. and **9d.** = 1s. 8d.
16s. and **10s.** = 26s.
£6 and **£10** = £16.

III. Decomposition

£	s	d		£	s.	d	d.
16	6	8$\frac{1}{2}$	is actually	15	25	19	1$\frac{1}{2}$
5	15	10$\frac{3}{4}$	worked as	5	15	10	$\frac{3}{4}$
10	10	9$\frac{3}{4}$		10	10	9	$\frac{3}{4}$

Farthings:—$\frac{3}{4}$d from $\frac{1}{2}$d "we cannot." Borrow 1d from the 8d ; $\frac{3}{4}$d from 1$\frac{1}{2}$d leaves $\frac{3}{4}$d.

Pence —10d from 7d. "we cannot." Borrow 1s. from the 6s.; 10d. from 1s. leaves 2d.; 2d. and 7d is 9d. (or 10d. from 1s 7d. is 9d.).

Shillings·—15s. from 5s "we cannot" Borrow £1 from the £16, 15s from £1 leaves 5s ; 5s and 5s. is 10s. (or 15s from £1 5s. is 10s.).

Pounds —£5 from £15 leaves £10.

As on page 289 the teacher should note the difficulty of subtracting, say, 13s. 7$\frac{3}{4}$d. from £5 using the method of decomposition.

Whichever method is used, provided plenty of practice is given, and checking is insisted upon, speed and accuracy should be obtained. The same method must be employed throughout the school. There must be no change from class to class.

Complementary addition is useful in sums where addition and subtraction are required.

Example A party of Girl Guides collected £17 17s for their holiday camp. Fares cost £1 19s 6d , camp equipment £3 3s 6d , food £5 15s , sundries 12s. 6d. What amount had they left?

	£	s.	d.
Amount collected	17	17	0
Fares	1	19	6
Equipment	3	3	6
Food	5	15	0
Sundries		12	6
Amount left	6	6	6

Working: (The figures in heavy type are those written in the answer).

Adding all but the top line·

6d , 1s , 1s. 6d and **6d.** = 2s
2s., 14s., 29s , 32s , 51s., and **6s.** = 57s = £2 17s.
£2, £7, £10, £11, and **£6** = £17.

MULTIPLICATION OF MONEY

Mental and Oral Work

1. What must be paid for 8 papers at 2d. each?
2. Find the cost of 3 lb. of apples at 7d. per lb.
3. What was the cost of 8 threepenny crackers?
4. What is the value of 5 sixpences? 3 florins? 2 halfcrowns? 7 fourpences?
5. Multiply 1s. 3d. by 2, 3, 4, 5.
6. Multiply 2s. 4d. by 2, 3, 4, 5.
7. Multiply 9d. by 5, 6, 7, 8.
8. Multiply 8s. by 6, 7, 8, 9
9. A woman paid 5d. for a loaf, and 3d. for a pint of milk. How much did she spend in this way in 7 days?
10. My train fare was 5d. and 'bus fare 2d each day. How much did I spend in this way in 10 days?
11. John had 3d., and Jim had twice as much. How much had Jim? How much had they together?
12. 1 lb of dates cost 4d., 1 lb. of apples cost twice as much What did they cost together?
13. ½ lb. of butter cost 10d. What was the cost of 1 lb.?
14. ½ pt. cream cost 1s. 8d What was the cost of 1 pt.?
15. ¼ lb. of toffee cost 6d. What was the cost of 1 lb ?
16. ¼ yd. of velvet cost 1s. 3d. What was the cost of 1 yd.?
17. 3 toys cost 2s. 6d. What would 6 cost?
18. 4 films cost 4s 4d What would 8 cost?
19. 2 yd. of ribbon cost 7d. What would 8 yd cost?
20. 3 lb. of rice cost 9d. What would 12 lb. cost?
21. A card cost 2d., and a calendar 3 times as much. What was the cost of the two together?
22. A tablet of soap cost 4d., and a nail brush cost 4 times as much. What was the cost of the two together?
23. How much must be paid for 4 weeks' rent at 12s. per week?
24. Sam earns 15s. a week. How much will he earn in 3 weeks?
25. Find the cost of 3 blankets at £1 5s. each.
26. Find the cost of 4 chairs at £1 6s each
27. Multiply the sum of 4d. and 5d. by 5.
28. Multiply the sum of 6½d. and 7½d by 7.
29. Find the total cost of 6 penny and 6 twopenny stamps (Note that here the addition should be done first)
30. Find the total cost of 4 books at 2s. 6d. each, and 4 books at 1s. 6d. each.
31. What is the cost of 7 boxes of paints at (*a*) 2s each? (*b*) 2s 2d. each?
32. What will be the cost of 10 boxes of soldiers at (*a*) 3s. each? (*b*) 3s 2d each?
33. Find the cost of 4 yd. of cretonne at 11¾d. per yd., 6 yd. at 11¾d. per yd.; 8 yd. at 11¾d. per yd.
34. Find the cost of 3 kettles at 1s 11½d. each; 5 at 1s. 11½d. each; 7 at 1s 11½d. each
35. Find the cost by changing the multiplier of 25 at 5d. each, (25d ×5=2s. 1d.×5= 10s 5d).
36. Find the cost by changing the multiplier of 50 at 7d. each; 60 at 7d. each, 100 at 4d. each.

There is a variety of methods to choose from in multiplication of money. Multiplication by numbers up to 12 is direct and simple, if tables are known. When numbers greater than 12 have to be dealt with, there is a diversity of methods Multiplication by factors may be employed; or direct multiplication using the column method of arrangement, or practice methods may be used; or, later, when fractions have been mastered, multiplication can often be performed speedily by expressing the money in pounds and fractions of a pound Examination candidates should know all of these methods of multiplication, and should be trained to choose the most suitable method for each example. It is not possible to teach all methods to the duller children under eleven. They should, however, learn short multiplication, and one method of long multiplication. Also, when they are learning reduction, practice methods in a simple form can be introduced and gradually extended. By "practice methods" here are meant the short cuts which were illustrated in the chapter on reduction.

Example: 5s.=$\frac{1}{4}$ of £1.

.. 114 articles at 5s each cost $\frac{1}{4}$ of £114, i.e. £28 10s

Some people would prefer to call this a fractional method of working

I. Short Multiplication is usually set out as follows

£	s	d.
4	5	6½×9
		9
38	9	10½

The working depends entirely upon a good knowledge of tables, and ability to change quickly from one denomination to another

½d.×9=4½**d.**
6d.×9=54d. Add 4d.;—58d =4s **10d.**
5s ×9=45s Add 4s ,—49s =£2 **9s.**
£4×9=£36. Add £2;—**£38.**

II. Factor Multiplication.

(*a*) £2 3s 4½d.×36.

£	s.	d.	
2	3	4½×36	
		6	
13	0	3	=6 times
		6	
78	1	6	=36 times

(*b*) £2 3s. $4\frac{1}{2}$d. × 37.

£	s.	d.	
2	3	$4\frac{1}{2}$ × 36	
		6	
13	0	3	= 6 times
		6	
78	1	6	= 36 times
2	3	$4\frac{1}{2}$	= 1 time
80	4	$10\frac{1}{2}$	= 37 times

Factor multiplication may be used for the multipliers 39, 53, 75, since $39 = (5 \times 8) - 1$; $53 = (6 \times 9) - 1$; $75 = (7 \times 11) - 2$. Many teachers do not teach factor multiplication at all nowadays but use instead the method which follows.

III. Column method of Multiplication.

£2 16s. 7d. × 53.

£	s.	d.
2	16	7 × 53
		53
149	18	11
43	30	371
106	530	—
—	318	30s. **11d.**
149	—	
	878	
	£43	**18s.**

Working:

(*a*) Find 7d. × 53, i.e. 53d. × 7.
Bring 371d to s. d., = 30s. 11d.
Write 11d. in the answer, and write 30s. under the shillings column.

(*b*) Find 16s. × 53, i.e. 53s. × 10, and 53s. × 6.
Write 530 and 318 under 30 in the shillings column.
Add this column. Total 878s.
Bring 878s. to £ s., = £43 18s.
Write 18s. in the answer and write £43 under the pounds column.

(*c*) Find £2 × 53.
Write 106 under 43 in the pounds column. Add.
Total £149. Write in the answer.

When farthings are introduced an extra column may be used Some teachers allow written division by 12 of the pence total, and written division by 20 of the shillings total. An alternative method of setting out is shown.

		£	s	d.
		2	16	7×53
				53
53d.× 7=371d.	=30s. 11d =	1	10	11
16s ×53=(530+318)s.=848s.	=	42	8	0
£2 ×53	=	106	0	0
		149	18	11

An advantage of the column method is that mistakes in working can easily be detected. An older method in which the working is practically the same as in the column method, but which differs in setting out, is shown below.

£	s	d.
2	16	7
		53
149	18	11

The amounts in heavy type are entered in the answer

12)371d

30s. **11d.**

530

318

20)878s.

£43 **18s.**

106

149

This is not so neat an arrangement, and can easily develop into that margin filled with untidy working figures abhorred by all teachers.

IV. The method of "Denominational Units".

In *Arithmetic*, by R. Hargreaves, M A. (C U.P), an interesting method is illustrated, the method of "Denominational Units."

Example: £3 6s. 7½d ×125.

A.

	£	s.	d.
(125 at 1s)	6	5	0
(125 at 1d)		10	5
(125 at ¼d.)		2	7¼

£	s.	d
3	6	7½
125		
375		
37	10	0
3	12	11
	5	2½
416	8	1½

Working:

(*a*) Multiply £3 by 125 (£375).

(*b*) Write down in column A the value of 1s.×125 (£6 5s.); 1d.×125 (10s. 5d.), ¼d.×125 (2s. 7¼d.). These are the denominational units.
To finish the calculation, £6 5s. must be multiplied by 6; 10s. 5d must be multiplied by 7; and 2s. 7¼d. must be multiplied by 2; the result is the sum of the four products obtained.

V. Practice method of Multiplication.

"Practice is a convenient and practical method of multiplication, originally brought into use to enable business calculations to be made with greater ease and rapidity. . . . It has the advantage of providing scholars with opportunities of devising short and easy cuts for themselves, and the selection of the unit and the grouping of parts should in the first instance be left to them."—*Handbook of Suggestions.*

This is not a new method in arithmetic. According to the *New English Dictionary* it was introduced in the sixteenth century by merchants and negotiants of Italy for the expediting of business calculations. It is a most interesting and useful method of calculation, not limited to the finding of costs, but of use in obtaining the result of any multiplication It is full of "short cuts," and once children have discovered a few of these they will delight in attempting to find others. Most experienced teachers will agree that children get more sums right by this method than by long multiplication. Of course there are many examples where it is far better to use long multiplication. Practice is not suitable for all types of sums. Probably it produces accuracy because short division is easier than long multiplication, and the divisions required are usually of an easy type. There is no reason why it should not be taught in a simple form to quite young children. As soon as they have learned money tables, and some reduction, a simple table of aliquot parts of 1s and £1 can be constructed and learned.

Fractions of 1s.

6d. = ½s.	4d. = ⅓s.
3d. = ¼s.	2d. = ⅙s
1½d. = ⅛s.	1d. = $\frac{1}{12}$s.

Fractions of £1.

10s. = £½	6s. 8d. = £⅓		4s. = £⅕
5s. = £¼	3s. 4d. = £⅙		2s. = £$\frac{1}{10}$
2s. 6d. = £⅛	1s. 8d. = £$\frac{1}{12}$		1s. = £$\frac{1}{20}$
1s. 3d. = £$\frac{1}{16}$		1s. 4d. = £$\frac{1}{15}$	

or the tables may be constructed in this form:

1s.=

6d×2.	4d.×3.
3d.×4.	2d.×6.
1½d.×8.	1d.×12.

£1 =

10s.×2	6s. 8d.×3.		4s ×5.
5s.×4.	3s. 4d.×6.		2s.×10.
2s. 6d ×8.	1s. 8d ×12.		1s.×20.
1s. 3d.×16.		1s. 4d.×15.	

Let the first exercises be simple, so that the children can grasp the underlying idea.

1. What would be the cost of 26 pencils at $1\frac{1}{2}$d each?

Cost of 26 at $1\frac{1}{2}$d. each $=\frac{26}{8}$ s. $=$ 3s. 3d.

2. What should be paid for 45 bulbs at 6d each?

Cost of 45 at 6d. each $=\frac{45}{2}$ s $=$ 22s. 6d. $=$ £1 2s 6d.

3. Find the cost of 38 calendars at 4d each

Cost of 38 at 4d. each $=\frac{38}{3}$ s $=$ 12s. 8d.

4. What should be paid for 21 yd of lace at $4\frac{1}{4}$d per yd?

Cost of 21 yd at 4d. per yd.	$=\frac{21}{3}$ s	=	7s. 0d.
Cost of 21 yd. at $\frac{1}{4}$d. per yd	$=\frac{21}{4}$ d	=	$5\frac{1}{4}$
Cost of 21 yd at $4\frac{1}{4}$d. per yd.		=	7s. $5\frac{1}{4}$

5. Find the cost of 44 balls of wool at $5\frac{3}{4}$d per ball.

	£	s	d.
Cost of 44 at 6d. each $=\frac{44}{2}$ s. $=$	1	2	0
Cost of 44 at $\frac{1}{4}$d each $=\frac{44}{4}$ d $=$			11
Cost of 44 at $5\frac{3}{4}$d. each $=$	1	1	1

6. A cook ordered 42 lb of raisins at $10\frac{1}{2}$d. per lb What was the cost?

	£	s.	d
Cost of 42 lb. at 1s. $=$	2	2	0
Cost of 42 lb. at $1\frac{1}{2}$d. $=\frac{42}{8}$ s. $=$		5	3
Cost of 42 lb. at $10\frac{1}{2}$d per lb. $=$	1	16	9

7. Find the cost of 65 books at 1s 6d. each.

	£	s	d
Cost of 65 at 1s. $=$	3	5	0
Cost of 65 at 6d. ($\frac{1}{2}$ of 1s) $=$	1	12	6
	4	17	6

8. What is the cost of a 9d. fare on 49 days?

		£	s.	d.
Cost of 49 at 6d. $= \frac{49}{2}$ s. $= 24\frac{1}{2}$s	=	1	4	6
Cost of 49 at 3d. $= (\frac{1}{2}$ of 6d.)	=		12	3
Cost of 49 at 9d.	=	1	16	9

9. The subscription to a club was 10s What was the total paid by 83 members?

Cost of 83 at 10s. $= \frac{£83}{2} =$ £41 10s 0d.

10. Find the cost of 78 umbrellas at 15s. each

		£	s.	d.
Cost of 78 at 10s. $= \frac{£78}{2}$	=	39	0	0
Cost of 78 at 5s. ($\frac{1}{2}$ of 10s.)	=	19	10	0
Cost of 78 at 15s.	=	58	10	0

11. A shopkeeper had 50 dolls worth 7s. 6d. each in his shop. What was their total value?

		£	s.	d.
Value of 50 at 5s. $= \frac{£50}{4}$	=	12	10	0
Value of 50 at 2s. 6d. ($\frac{1}{2}$ of 5s.)	=	6	5	0
Value of 50 at 7s. 6d.	=	18	15	0

12. A girl earned 16s. 8d. per week. What did she earn in 39 weeks?

		£	s.	d.
Value of 39 at 10s. $= \frac{£39}{2}$	=	19	10	0
Value of 39 at 6s. 8d. $= \frac{£39}{3}$	=	13	0	0
Value of 39 at 16s. 8d.	=	32	10	0

There are many other prices suitable for working in this way, e g

2d., 3d., 5d., 7d., 8d., 10d., 11d.,
$1\frac{1}{4}$d., $1\frac{3}{4}$d., $2\frac{1}{4}$d., $2\frac{1}{2}$d., $2\frac{3}{4}$d., $3\frac{1}{4}$d., $3\frac{1}{2}$d., $3\frac{3}{4}$d.,
$4\frac{1}{2}$d., $4\frac{3}{4}$d.,—and so on up to 1s
Then 1s. $0\frac{1}{2}$d., 1s. 1d., 1s 2d., etc.
2s., 2s 3d., 2s. 4d., 2s 9d.,—and so on, with larger amounts.

It is not necessary to insist on all the working being strictly on practice lines Sometimes other working, such as reduction or multiplication, will be more suitable.

Example. Find the cost of 260 books at 7s. each

		£	s.	d
Cost of 260 at 1s.	=	13	0	0
Cost of 260 at 7s. (by multiplication)	=	91	0	0

A child of 10 was given this sum to work: "What was the total cost of 50 bulbs at 4d. each, and 50 at 3d each?"

The teacher expected·

				s.	d.
Cost of 50 at 4d	=	$\frac{50}{3}$ s.	=	16	8
Cost of 50 at 3d	=	$\frac{50}{4}$ s.	=	12	6
		Total		£1 9	2

The child said "50d. are 4s. 2d The answer is 7 times 4s. 2d." And proceeded to work

s.	d.
4	2×7
	7
29	2

This is an example of what we want children to do. We would have them know various methods, and select and use for themselves those which they find easiest and quickest.

The last example illustrates another short method which can be used to advantage. It depends upon the principle that was noted before,—$3\times5=5\times3$,—and can be called finding the cost by changing the multiplier Thus 50 at 5d. each, is easily worked as 5 times 50d.; that is 5 times 4s 2d

30 at 7d. each, becomes 2s. 6d.×7
25 at 9d. each, becomes 2s. 1d ×9
38 at 8d. each, becomes 3s 2d ×8

Still another short method of finding the cost which children should know deals with the draper's favourite prices —1s 11d , 2s. 11½d., 3s 11d., 4s. 11½d., 5s 11¾d., etc.

1. The cost of 6 yd. at 1s 11d per yd should be worked as·
   (2s×6)—(1d ×6) i e. 12s.—6d. or 11s. 6d.
2. 10 yd. at 2s 11½d. per yd.
   Cost=(3s.×10)—(½d.×10)=30s —5d.=£1 9s. 7d
3. 15 vests at 5s. 11¾d each.
   Cost=(6s.×15)—(¼d.×15)=90s —3¾d.=£4 9s. 8¼d.

Bills provide useful work at this stage.

Multiplication, addition, reduction, practice, short methods can all be introduced in them The teacher should beware of setting awkward multiplications with huge multipliers. The

necessity for such working does not arise in everyday life. In business where such calculations are required ready reckoners are always used. The only purpose such sums can serve is to test speed, accuracy, or power of concentration. In real life it is the multiplication of small sums of money which is required most frequently.

DIVISION OF MONEY

For the teaching of division of money regular oral and mental work are of the utmost importance. In the exercises given, many of the usual types of division are introduced, and in numbers 25 to 32 are easy examples of unequal division. The sooner children grasp the underlying principle of unequal division the better will they be able to attack problems.

1. What was the cost of 1 cake when 4 cost 1s. 4d.?
2. What was the cost of 1 yd. when 6 yd. cost 2s 6d ?
3. Find $\frac{1}{2}$ of 1s. 8d.; $\frac{1}{2}$ of 2s 4d., $\frac{1}{2}$ of 2s. 9d ; $\frac{1}{2}$ of 3s. 6d.
4. Find $\frac{1}{4}$ of 1s. 4d.; $\frac{1}{4}$ of 2s. 4d.; $\frac{1}{4}$ of 3s.; $\frac{1}{4}$ of 4s. 8d.
5. A gallon of milk cost 2s. 8d. What was the cost of $\frac{1}{2}$ gallon?
6. 1 lb of bacon cost 1s 10d. What was the cost of $\frac{1}{2}$ lb.?
7. 4 oranges cost 6d. What was the cost of 2?
8. 10 lemons cost 1s. 8d What was the cost of 5?
9. What sum of money multiplied by 3 amounts to 1s. 3d ?
10. What sum of money multiplied by 5 amounts to 2s 1d.?
11. Ivy bought a pen and 2 pencils for 8d. The pen cost 4d. What was the cost of each pencil?
12. Mother bought a jam roll and 2 tarts for 1s. 2d. The roll cost 10d. What was the cost of each tart?
13. Divide 2s. 6d. by 2, 3, 4, 5, 6, 10
14. Divide 7s. by 2, 3, 4, 6, 7.
15. 5 white mice cost 6s. 3d What was the cost of one?
16. 7 girdles cost 8s. 2d. What was the cost of one?
17. Find $\frac{1}{2}$ of 9s.; $\frac{1}{2}$ of 5s. 6d ; $\frac{1}{2}$ of 7s. 2d
18. Find $\frac{1}{3}$ of 4s ; $\frac{1}{3}$ of 5s.; $\frac{1}{3}$ of 7s.
19. Find $\frac{1}{4}$ of 5s., $\frac{1}{4}$ of 6s., $\frac{1}{4}$ of 7s
20. Find $\frac{1}{5}$ of 4s. 2d ; $\frac{1}{5}$ of 7s 6d., $\frac{1}{5}$ of 8s 4d
21. If 6 lb. of tea cost 13s. 6d., what will 3 lb cost?
22. If 8 ties cost £1, what will two ties cost?
23. Find the values of:—
1s. 3d.÷2, 4, 8$\frac{1}{4}$d.÷3, 11; 10$\frac{1}{2}$d ÷6, 7.
24. 11$\frac{1}{4}$d ÷5, 9; 8$\frac{3}{4}$d ÷5, 7; 1s. 3$\frac{3}{4}$d ÷7, 9.
25. Share 10d between Amy and Eva, giving Amy 2d. more than Eva
26. Share 1s 6d. between Tom and Ted, giving Tom 2d. more than Ted.
27. A bar of chocolate and a tin of toffee together cost 3s. The toffee cost 6d more than the chocolate. What was the cost of each?
28. Knitting pins and 4 oz. of wool cost 2s. 7$\frac{1}{2}$d. The pins cost 7$\frac{1}{2}$d What was the cost of 1 oz. of wool?
29. 1 lb. of cheese and 6 eggs cost 1s. 6d The cheese cost 9d. What was the cost of 1 egg?
30. A toothbrush and powder together cost 1s. The brush cost twice as much as the powder. What was the cost of each?

31. A bottle of ink and a jar of paste cost 2s. The paste cost twice as much as the ink What was the cost of each?
32. Mary and Millie together had 2s 4d Mary had 3 times as much as Millie What had each?
33. Find the cost of 1 orange when a dozen cost 2s. 6d.
34. Find the cost of 1 yd. when a dozen yd cost 3s. 9d
35. 3 toys were bought for 3s and sold for 4s What was the profit on one?
36. 4 rabbits were bought for 5s 6d. and sold for 6s. 6d. What was the profit on one?

Division of money, like division of numbers, has two aspects.

I. Division of money by a number (Partitive).
Divide £2 3s. 4d. by 40 *Answer* 1s 1d.

II. Division of money by money (Quotitive).
How many times is 3s. 4d contained in £2 3s 4d.? *Answer* 13.
There are three stages in division of money by number.

(*a*) Short division.
(*b*) Factor division. (This is often omitted entirely.)
(*c*) Long division.

Short Division

This is usually set out as follows:

```
   £  s. d
8)10  2  8
 ---------
   1  5  4
```

Working: Divide first into the pounds. Change the remainder to shillings, add in the shillings in the dividend, and divide into the shillings. Change the remainder to pence, add the pence in the dividend, and divide into the pence. Children will fail here if they have not a good knowledge of the multiplication tables, and if they cannot do the required reductions easily Theoretically, any division of money may be performed so that there is no remainder, e.g. £1 13s 9d ÷ 8 = 4s. 2⅝d. Actually, the answer would be either 4s 2d, remainder 5d.; or 4s. 2½d., remainder 1d.

Factor Division

The *Handbook of Suggestions* does not encourage the use of this method. "The rules for long multiplication and division seldom present much difficulty, but division by factors is less readily understood, and some teachers may think it better to omit this process altogether."

Factor division is a succession of short divisions.

Example: £76 7s. 9d. ÷ 63.

```
   £  s. d.
7)76  7  9
 ---------
9)10 18  3
 ---------
   1  4  3
```

The difficulty of course comes where there are remainders. The theory of this was discussed in the notes on division of number

£79 7s. 9d ÷ 35

```
  £  s  d.
5)79  7  9
---------
7)15 17  6 r. 3d.     Remainder = (2d × 5) + 3d.
---------
   2  5  4 r. 2d.               = 1s. 1d.
```

Long Division of Money

As teachers know, this is the most difficult of all the money rules for children to grasp. Besides the difficulties of long division of number, there are the added trials of reduction to shillings, pence and farthings. It is well not to attempt to teach long division of money too soon. The usual method of arranging the work is the column method, and this shows clearly that the process is the reverse of long multiplication.

Example. £30 17s. 6d.—26.

```
     £   s.   d.
     1   3    9
   -------------
26)30   17    6
   26   80  228
   --   --  ---
    4   97  234
        78  234
        --  ---
        19
```

Easy examples should be given first and the children should be introduced to the difficulties gradually. This is the type of answer first exercises should have.

1. £1 2s.; £2 3s.; £3 4s ; £2 7s
2. £1 2s 2d ; £2 4s. 3d ; £3 5s 6d.; £4 6s 8d.
3. £1 10s. 4d , £1 11s. 3d., £2 12s 5d ; £3 14s 6d.
4. £2 5s 3¼d.; £2 4s. 2½d ; £1 6s. 4¾d ; £2 7s. 10½d.
5. 8s. 5d.; 9s 8d., 12s 3d., 15s. 6d.
6. £2 0s. 3d.; £3 2s 0½d ; £1 0s 11¾d , £3 6s 0¼d.

Division of Money by Money

Questions requiring this type of division are worded.—

(*a*) "How many times can 9s 6d. be taken from £10 18s 6d "
(*b*) "How many times is 9s 6d contained in £10 18s 6d.?"

(*c*) "Find how many times the sum of money below the line is contained in that above the line, $\frac{£10\ 18s.\ 6d}{9s\ 6d.}$"

(*d*) "How many umbrellas at 9s. 6d each are worth £10 18s 6d ?"

(*e*) "Find the value of $\frac{£10\ 18s.\ 6d}{9s.\ 6d.}$"

There are many ways in which questions (*a*), (*b*), (*c*), may be put. The important fact to note is that no division is possible until the sums of money are expressed in terms of the same unit. In the example (*d*) given above both sums of money would be expressed as sixpences:

$$\text{Number of umbrellas} = \frac{£10\ 18s\ 6d}{9s.\ 6d.} = \frac{437}{19} = 23$$

WEIGHTS AND MEASURES

British weights and measures have a long and interesting history They have altered but little during the past thousand years Such alterations as have been made have all been in the direction of simplification and improvement. They are the modern representatives of the ancient measures of the East, and of the Roman Empire. It is probable that the Saxons, when they arrived in England in the fifth century, adopted the weights and measures already in use, just as the Normans did six centuries later

In teaching weights and measures, the approach must be through the concrete. It is useless to teach a string of words and numbers in a formal table Children must know what the words stand for The *Handbook of Suggestions* carefully defines what is meant by concrete methods. They "can be used to give the children definite ideas of the various units and quantities which occur in arithmetical calculations. 'Exercises in Shopping' will render coins, weights, and lengths familiar; measurements of the schoolroom, the playground, the desks, etc., will give ideas of length."

The *Report on the Primary School* referring to weights and measures says, "A mere mechanical knowledge of these tables is not enough; the child must have such real experience of the various denominations included that they stand for definite realities in his mind. The smaller units can be learnt from exercises that can be done in the classroom, the larger by establishing associations in the mind with familiar objects—thus the country child can associate the term acre with the area of a field which he knows well, the town child with the area of a football field, or at worst with the area of his school playground, and similarly for the mile, gallon, hundredweight and ton"

Long Measure

Children will be interested to know a little of the history of the inch. The smallest measure of length used by the Anglo-Saxons was the barley-corn, and in the laws of Edward I. it is stated that 3 grains of barley, dry and round, make an inch, 12 inches make a foot, 3 feet make an "ulna"

"And it is to be remembered that the Iron Ulna of our Lord the King contains 3 feet and no more: and the foot must contain 12 inches measured by the correct measure of this kind of ulna. that is to say, one thirty-sixth part of the said ulna makes one inch, neither more nor less."

The Anglo-Saxon "ulna" was the length of the forearm of a man from the elbow to the end of the middle finger (about 18 in. in length). The royal ulna of Edward I. was about twice the length of the old ulna, and was afterwards called the "yard" (A.S "gyrd"—a rod, a measure). It has been suggested that the iron standard yard was made the length of the King's arm, but Col. Sir C. M. Watson, in his book *British Weights and Measures*, regards this suggestion as childish.

Children will be familiar with yards, feet and inches, because of the shopping exercises done, and also because the teacher will probably have followed the hint given in the *Handbook of Suggestions* and have introduced these terms in sums on the simple rules.

Examples

1. There are 12 inches in a foot How many inches are in 9 ft.? 16 ft.? 28 ft.?
2. There are 3 feet in a yard How many feet are in 16 yd ? 44 yd ? 192 yd.?
3. There are 36 inches in a yard. How many inches are in 4 yd ? 11 yd.? 15 yd ?
4. There are 1760 yd in a mile, and 3 feet in a yard. How many feet are in a mile?

The teacher wants to make these terms real to the child. If each child has a 12-inch ruler, his own immediate surroundings in the classroom provide a great variety of objects which can be measured and used in exercises. The length and breadth of a page of his exercise book, of his various textbooks, of his pens and pencils, of his pencil box, of his desk, the height of his seat from the floor, the height of his desk from the floor,—all these can be measured, and their measurements used in simple exercises which will add interest to the lesson.

A sheet of ruled foolscap will provide a number of exercises in measurement:

1. What is the length of the sheet? the breadth?
2. How wide is the margin at the top? at the bottom? at the side?
3. How many spaces make an exact number of inches?
4. How far is it from the 1st to the 4th line?

Great interest is aroused in a lesson if the heights of several children are measured. The teacher should choose some exceptionally tall children, some of average height, and some short ones. An easy way to measure children is to let them stand with their backs to a wall, put a ruler on the top of each child's head, and make a chalk mark (which can easily be rubbed off afterwards) on the wall A tape measure can then be used to find the height of each child in inches. The class may write down these heights in inches, and afterwards give them in feet and inches Let the children understand that it is usual to tell a person's height in feet and inches, and not in yards, etc. When children know how to set about measuring, they can work in pairs and measure each other. It is a good plan to make some strips of cardboard two or three inches wide, and exactly one yard long, and to mark inches plainly on each. These can be used by the children when they are measuring rooms, corridors, playgrounds, etc. Some teachers like to have a "yard" of this kind fixed on the classroom wall in a place where it can be seen easily.

Cotton or thread is a cheap and convenient medium for measuring somewhat longer distances. This can be bought in reels of various lengths,—50 yards, 80 yards, 100 yards, 200 yards, 250 yards, 400 yards, 500 yards, 1,000 yards, etc ,—and many interesting exercises can be done by means of it.

Interest is aroused in lessons on length if children are from time to time given some exercises in estimating lengths. Let them make their "guess" and record it; then let them check their answer by actual measurement wherever possible, or by the teacher giving the correct measurement. Measurements of objects beyond the school buildings may sometimes be given, e.g. height of the church tower; height of a lamp post; height of a public building; a well-known tree; length of a street; distance between two buildings; distance between two villages, or towns.

Other Exercises

1. How far can you span?
2. How long is your walking step?
3. How long is the longest step you can take?
4. How many steps long is your room?
5. How many feet long is your room?
6. How many feet wide is your room?
7. How tall are you on tiptoe?
8. How high is the door handle?
9. How high can you reach?
10. How wide can you stretch?
11. How long is the window pole?
12. What is the length of a brick? the width? the thickness?
13. What is the length of your footmark from heel to toe?
14. Use a cardboard halfpenny and find its width. How far would 6 stretch if placed side by side?
15. How long is your longest finger? your little finger?

Many similar exercises will suggest themselves to the teacher.

Chains, Furlongs, Miles

The difficulties of practical work when using the larger units—chains, furlongs, miles,—with young children, are many. In teaching these units the teacher is obliged to rely, to a large extent, on descriptive methods. With classes of older children the actual measuring chain of 100 links may be used in the playground. The chain is the modern name for the old acre's breadth, and boys will seize upon the fact that it is the length of a cricket pitch from wicket to wicket. The furlong in Early England was the acre's length; its name comes from the ancient craft of ploughing,—"furrow-long".

The mile may be made real to children by telling them that it is the distance from their school to the station, or some other well-known landmark. Actual distances in miles in their own locality should be taught. Also they should be told that a mile is the distance an adult can walk at a fair pace in a quarter of an hour. Half a mile is a walk of ten minutes for a boy or a girl. Tables of length must be learned by heart, not merely in order that the child can repeat the table, but so that he can answer questions rapidly on any isolated line. Frequent written tests of tables should be given. Probably tables are more easy to learn by heart at the age of 8 or 9 than at any other time. It is certain that time cannot be spared for this memory work later in the child's school life.

Exercises in reduction help to fix the table of long measure in the child's mind, and prepare the way for the four rules These exercises should be simple in type, and should require reduction only from one unit to that above it, or below it, in the table. There is never any

necessity to give long reduction sums running through the whole table. If miles have to be expressed in yards, then the fact that 1760 yd. equal 1 mile should be used. If miles have to be expressed in feet, then the number 5280 should be used.

Children can make for their own use ready reckoners from the table.

1 mile	=	1760 yd	1 mile	=	5280 ft.
1 furlong	=	220 yd.	1 furlong	=	660 ft.
1 chain	=	22 yd.	1 chain	=	66 ft
			1 yard	=	3 ft

Mental drill and oral work in reduction should be given.

1. How many inches are in 4 ft ? 5 ft ? 2 ft 2 in.? 3 ft 6 in ? 4 ft. 9 in.?
2. What part of a foot is 6 in.? 3 in ? 9 in.?
3. Change to feet: 36 in.; 27 in.; 42 in.; 50 in
4. How many feet are in 3 yd ? 4 yd.? 5 yd 2 ft.? 10 yd 2 ft.?
5. How many inches are in 1 yd.? $\frac{1}{2}$ yd ? $\frac{1}{4}$ yd ? $\frac{3}{4}$ yd.?
6. How many inches are marked on a tape measure 3 ft. 4 in long? 5 ft long?
7. Elsie made an overall 42 in. long. How many yards and inches long was it?
8. Find the cost of 2 yd. of curtain wire at 3d. per foot.
9. Rope was 4d. per yd. How much should be paid for 15 feet?
10. If ribbon was $\frac{1}{4}$d per inch, how much would 1 yd. cost?
11. How many 3 in. lengths could be cut from binding tape 2 ft. 3 in long?
12. How many 5 in. lengths could be cut from $1\frac{1}{4}$ yd. of cord? The setting out of formal reduction sums may be similar to that adopted for money.

Example· How many inches are in 14 ft 8 in ?

I.

```
 ft.  in.
 14    8
 12
 ---
176 in.
```

II.

```
 ft.  ins.
 14    8
      168
      ---
      176
```

III. Express 6 yd. 2 ft. 10 in in inches.

```
36×6=216
12×2= 24
  10= 10
     ---
     250 in.
```

Some teachers prefer the second method of setting out to the traditional method, and do not allow the multipliers to be written The third method is neat and easily understood.

I. Express 500 inches in yd, ft, in

```
   in.
12)500
  3)41 ft  8 in
    13 yd. 2 ft. 8 in.
```

II

yd	ft.	in		yd.	ft.	in.
13	41	500	or			500
13	2	8			41	8
				13	2	8

The first method is the traditional method and is probably easier for children to understand.

Addition and Subtraction

It is quite a good plan to work some addition and subtraction of money sums, using pence and shillings only, and show the children that no new kind of working is required for addition and subtraction of feet and inches.

	s.	d.		ft.	in.
	1	9		1	9
	2	8		2	8
	3	5		3	5
	7	10		7	10
	s.	d		ft.	in
From	4	2	From	4	2
Take	2	9	Take	2	9
	1	5		1	5

Easy oral work in addition and subtraction should precede written work

1. Add together 10 in. and 11 in.; 1 ft 4 in. and 8 in , 2 ft. 3 in. and 10 in.; 1 ft. 9 in. and 7 in.
2. What is 1 yd. 1 ft +2 ft ? 1 yd. 2 ft.+1 yd 1 ft.?
3. From 1 ft. 2 in. take 6 in.; from 2 ft 5 in. take 1 ft. 3 in , from 1 yd 1 ft take 2 ft.; from 2 yd. 1 ft. take 1 yd. 2 ft.
4. John was 3 ft. 10 in. Harry was 4 in. taller. How tall was Harry?
5. Bertha could stride 5 ft Ann could stride 3 in. less. How far could Ann stride?
6. From a stick 2 yd. long, 2 ft. was cut off. What length remained?

When children are thoroughly accustomed to this work, give written exercises in addition and subtraction. First exercises should be simple, and children should be made to check

each answer, the addition by adding in the opposite direction, the subtraction by adding the two lower lines to make the top line. Later, the other units may be similarly treated, oral work first

1. How many yards are in 1 chn.? 2 chn.? ½ chn ? 1½ chn ? 4 chn.?
2. How many chains are in 1 fur ? 3 fur ? 5 fur.? ½ fur.? 3½ fur.?
3. How many furlongs are in 1 ml ? 4 ml ? 7 ml.? ½ ml.? ¼ ml ? ¾ ml.?
4. How many yards are in 1 ml.? ½ ml ? ¼ ml.? ¾ ml.?
5. Bob was given 100 yd start in a mile race. How many yards had he to run?
6. Mary was given 30 yd start in a ½ mile race. How many yards had she to run?
7. How many yards of fencing will be required for one side of a garden 2½ chn long?
8. If a man walks a mile in ¼ hr., how many miles will he walk in an hour?
9. Change to chains: 44 yd , 66 yd., 88 yd
10. Change to miles: 16 fur.; 40 fur.; 54 fur.
11. A boy walked 99 yards How many chains was this?
12. A street was 825 yd. long How many yards was it short of ½ mile?

This should be followed by simple written exercises in reduction both ways. Reduction from miles to yards can be done very simply by using the ready reckoner shown on page 324.

Example: How many yards are in 3 ml. 4 fur. 5 chn. 7 yd.?

$$\begin{aligned} 1760\times3 &= 5280 \\ 220\times4 &= 880 \\ 22\times5 &= 110 \\ 7 &= 7 \\ \hline & 6277 \text{ yd.} \end{aligned}$$

If the numbers 1760, 220, 22 are memorised, they can be used without reference to the ready reckoner.

Easy oral exercises in addition and subtraction should precede written work

1. Find the sum of 1 chn 6 yd. and 11 yd ; 2 chn. 4 yd. and 18 yd ; 3 chn. 2 yd. and 1 chn 12 yd.
2. What is 1 fur. 5 chn +7 chn ; 1 fur. 8 chn +8 chn.
3. From 1 ml. take (*a*) 3 fur ; (*b*) 5 fur ; (*c*) 6 fur.
4. From 2 fur take (*a*) 5 chn ; (*b*) 8 chn ; (*c*) 1 fur. 2 chn.
5. John walked 7 fur. in the morning and 9 fur. in the afternoon. How many miles did he walk altogether?
6. A road was 2 fur. in length. Alice lived 7 chn. from one end. How far from the other end did she live?

Work of this kind should be followed by written exercises, and the difficulty can be increased gradually at the discretion of the teacher Practical work, such as drawing plans to scale and estimating distances on maps, can also be taken Children are usually interested in knowing the ordinary rates per hour of walking, cycling, etc.

Walking.—4 m.p.h. (See that m.p.h. is understood.)
Cycling.—10 m.p.h.
Motor bus.—20-30 m.p.h. (Not motor coaches.)
Slow train.—20-30 m.p.h.
Fast train.—50-90 m.p.h.
Flying.—400-600 m.p.h., and much faster. (The speed greatly varies according to the kind of machine and its use.)

When addition and subtraction of length have been mastered, multiplication and division should follow. It is not necessary to give long, tedious, mechanical examples of either. These rarely occur in real life. The most that has to be done as a rule, is to multiply or divide yards, feet, inches, or miles, furlongs, chains; or chains, yards, feet. The applications of length to everyday things are numerous, so that many calculations can very easily be set in concrete form.

The column method of setting out long multiplication and long division is very satisfactory.

Example: What was the total length of wire on 17 coils, each containing 16 yd. 1 ft. 9 in.?

I.

yd.	ft.	in.
16	1	9×17
		17
281	2	9
9	12	153
170	17	12 ft. 9 in.
102	29	
281	9 yd. **2** ft.	

II.

yd.	ft.	in.	
16	1	9×17	
		17	
4	0	9	9 in.×17=153 in. =12 ft. 9 in. =4 yd. 9 in.
5	2	0	
272	0	0	
281	2	9	1 ft.×17=17 ft. =5 yd. 2 ft.
			16 yd.×17=(160+112) yd. =272 yd.

III Find the 35th part of 101 ml. 7 fur 5 chn

```
       ml.  fur.  chn.
        2     7     3
      ----------------
  35)  101    7     5
        70  248   100
        --   --    --
        31  255   105
            245   105
             --    --
             10
```

The work given here on length is not intended to be one year's course, but is intended for the four years for children from the age of seven to eleven.

Weight

As in the table of length, the first effort should be to make the common units of weight real to the children, rather than to teach the whole table of weight as memory work. The most familiar units to children are pounds and ounces, and these should be dealt with first. Children who have done shopping for their parents or neighbours will tell of buying 1 lb of sugar, ½ lb. of cheese, ¼ lb of butter or tea, 7 lb. of potatoes, a 1-oz or 2-oz. tin of mustard, 2 lb. of rice, etc. Most schools possess a pair of scales and a set of weights A convenient medium for weighing exercises is sand; to provide a change, haricot beans or bran may be used. It is a useful exercise to have a 1 lb. bag of bran and require a child, without the use of weights, to make it into separate half-pounds, and quarter-pounds. The composition of a set of weights should be noticed,—1 oz., 2 oz , 4 oz , 8 oz The children should be asked what weights they would use to weigh amounts up to one pound.

1 oz
2 oz.
3 oz =1 oz +2 oz
4 oz.
5 oz.=4 oz +1 oz
6 oz =4 oz +2 oz
7 oz.=4 oz.+2 oz +1 oz
8 oz.
9 oz =8 oz +1 oz
10 oz.=8 oz +2 oz
11 oz =8 oz +2 oz +1 oz
12 oz =8 oz.+4 oz.
13 oz =8 oz +4 oz +1 oz.
14 oz.=8 oz.+4 oz +2 oz
15 oz =8 oz +4 oz +2 oz +1 oz.

They will thus discover that any number of ounces from 1 to 15 can be weighed by the use of four weights Weighing exercises will be more interesting to the children if there is a purpose underlying what they are required to do.

1. *Weigh an orange.* What weight was carried by a boy who had 6 such oranges in a basket? About how many oranges would you get in 1 lb.? Seville oranges are sometimes sold by the pound Suppose they were $1\frac{1}{2}$d. each or 4d. per lb., which would be the cheaper way to buy?
2. *Weigh a loaf of bread.* How many pounds of bread were in the baker's basket when it held 7 loaves? How many pounds of bread are used by a family who eat 12 loaves a week? How many ounces of bread are in 1 loaf?
3. *Weigh 3 pennies.* If the 1-oz weight of a set was lost what could be used instead of it? What could be used instead of the 2-oz. weight?
4. *Weigh 5 halfpennies.* How many halfpennies would have to be used to weigh $\frac{1}{4}$lb of sweets?

Many similar exercises in the weighing of small articles will suggest themselves to the teacher. It is probably easier to arrange the class in groups for work of this kind, and allow one group to be doing the actual weighing, while another group is doing something else,—making ready reckoners, working exercises on the data already collected from weighing, or building up and learning the 14 times and 16 times tables, which are particularly useful in weight. The table of weight must be impressed upon the memory by frequent oral work

1. How many oz. are in 1 lb.? $\frac{1}{2}$ lb.? $\frac{1}{4}$ lb? $\frac{3}{4}$ lb?
2. How many oz are in 2 lb.? 3 lb? $1\frac{1}{2}$ lb? $1\frac{1}{4}$ lb? $2\frac{1}{2}$ lb?
3. How many lb are in 32 oz? 24 oz.? 48 oz?
4. How many $\frac{1}{2}$ oz. packets of sweets could be made from 1 lb? $\frac{1}{2}$ lb? $\frac{1}{4}$ lb?
5. A dessert spoon holds 1 oz. of flour How many spoonsful would be needed to measure out $\frac{3}{4}$ lb. flour?
6. A teacher bought $1\frac{1}{2}$ lb of sweets and made them into 2 oz packets. How many packets had she?

The next units most familiar to children are tons and hundredweights. They have seen coal carts about with prices marked up per cwt. and per ton, and they have heard their parents talk about hundredweights, $\frac{1}{4}$ tons, $\frac{1}{2}$ tons, and tons of coal and coke It is sometimes surprising how many other goods, which are sold by the ton, are noticed by children in the streets, particularly if there is any building being done in the neighbourhood, or if there is a railway goods yard near.

The analogy 20 cwt = 1 ton, and 20s. = £1 should be noticed. Oral work should be given to familiarise children with the table.

1. How many cwt are in 1 ton? $\frac{1}{2}$ ton? $\frac{1}{4}$ ton? $\frac{3}{4}$ ton?
2. How many cwt. are in $1\frac{1}{2}$ tons? $1\frac{1}{4}$ tons? $2\frac{1}{4}$ tons? $1\frac{3}{4}$ tons?
3. How many tons are in 40 cwt? 60 cwt.? 80 cwt.?
4. $\frac{1}{2}$ ton of coal was delivered in 2-cwt sacks. How many sacks were there?
5. How many 2-cwt. sacks should be delivered for $1\frac{1}{2}$ tons of coal?
6. Coal was 2s. per cwt. What was the cost of 1 ton?
7. A stove burned $\frac{1}{2}$ cwt. coal a day. How many days would $\frac{1}{2}$ ton last?

The stone is a variable measure, although, according to the table, it is 14 lb The Smithfield stone (for dead meat) is 8 lb. only, but the stone we are concerned with in the classroom is 14 lb. Children are interested in this weight because they probably have been weighed several times themselves, and they know their own weight in stones and pounds. If easy

access can be obtained to the school weighing machine, there will be no difficulty in making the stone real to children. When practical work of this kind has been done, and the children really know what is meant by the various units of weight, the table should be memorised, reduction sums from one unit to the one above it or below it in the table worked, and the four rules learned. Any of the methods applicable to reduction, multiplication and division of money and length, are applicable to reduction, multiplication and division of weight.

An example of each is given here.

I. How many ounce tins of mustard could be packed from 14 lb. 8 oz. of mustard?

```
lb.  oz.
 14   8
 16
 ---
148
 84
 ---
232 oz.         Answer 232 tins
   or
 lb   oz.
 14    8
     140
      84
     ---
     232 oz.    Answer 232 tins.
```

II. Express 2 tons 6 cwt. in lb.

```
                lb.
2240×2 = 4480
 112×6 =  672
         ----
         5152        Answer 5152 lb.
```

III. Change 454 oz to lb.

```
       28 lb.  6 oz.
    -------------
16)454 oz.
   32
   --
   134
   128
   ---
     6         Answer 28 lb  6 oz.
```

If division by factors has not been taught, children must be shown how to set out their work for successive reductions requiring long division.

IV. Change 3698 oz to stones

```
   231 lb.  2 oz.            16 st.  7 lb  2 oz
 ______________            _________________
16)3698 oz.               14)231 lb.  2 oz.
   32                        14
   --                        --
    49                       91
    48                       84
    --                       --
     18                       7
     16
     --
      2                 Answer 16 st.  7 lb.  2 oz.
```

When children have learned the 14 times and 16 times table, the work can be shortened considerably.

The column method of multiplication and division is recommended by many leading authorities.

V. 5 lb 6 oz. × 51. *Answer* to be in lb.

```
  lb      oz.
   5       6×51
           51
 ______________
 274        2
 ______________
           19
          ---
   19  16)306
           16
          ---
  255     146
          144
  ---     ---
  274       2          Answer 274 lb.  2 oz.
```

VI 211 tons 15 cwt. ÷ 55

```
     tons cwts.
       3   17
     _________
 55)211    15
    165   920
    ---   ---
     46   935
          55
          --
          385
          385          Answer 3 tons  17 cwt.
```

Note that in multiplication sums the unit in which the answer is to be given should always be stated. E.g. in the sum V. above, the answer is given in pounds; it might have been given in stones, quarters or cwt.

Weight and Cost

Cost, in connection with weight, has to be reckoned so frequently in every-day life, that we are bound to consider it important in school life There are several short cuts and simple rules which can be taught in this connection Some of them have already been dealt with elsewhere, but for convenience they will be repeated here. Teachers will of course exercise their discretion as to when these short methods should be introduced. Certainly examination candidates should know them.

1. As there are 20 cwt. in 1 ton, 1 ton at 1s. per cwt costs £1.

1 ton at 2s. per cwt. costs £2
1 ton at 5s per cwt. costs £5.
1 ton at 6d ($\frac{1}{2}$s) per cwt costs 10s (£$\frac{1}{2}$)
1 ton at 3d. ($\frac{1}{4}$s) per cwt costs 5s (£$\frac{1}{4}$).
1 ton at 9d. ($\frac{3}{4}$s) per cwt costs 15s. (£$\frac{3}{4}$)
1 ton at 4d ($\frac{1}{3}$s) per cwt costs 6s 8d (£$\frac{1}{3}$).
1 ton at 3s 3d per cwt costs £3 5s—and so on

2. The short method for reckoning the cost of a dozen from the price of one has been given, and this can be applied to 1 dozen lb 1 doz. lb sugar at 2$\frac{3}{4}$d. per lb costs 2s. 9d

3. Finding the cost by changing the multiplier has already been given, and it is particularly useful when dealing with the cost of pounds of goods

(*a*) Find the cost of 25 lb candles at 3$\frac{1}{2}$d. per lb.

3$\frac{1}{2}$d ×25=25d ×3$\frac{1}{2}$
=2s. 1d ×3$\frac{1}{2}$
=7s 3$\frac{1}{2}$d

(*b*) A butcher sold 84$\frac{1}{2}$ lb. of waste fat at 7d. per lb. What was its cost?

7d ×84$\frac{1}{2}$=84$\frac{1}{2}$d ×7
=7s. 0$\frac{1}{2}$d.×7
=£2 9s. 3$\frac{1}{2}$d

4. 16 oz.=1 lb Therefore $\frac{1}{4}$d. per oz.=4d per lb.
and $\frac{3}{4}$d per oz.=1s. per lb

If the price is 2s. per lb. then the price per oz. is $\frac{3}{4}$d.×2, i.e. 1$\frac{1}{2}$d.
Similarly 3s per lb is $\frac{3}{4}$d.×3 per oz. i e 2$\frac{1}{4}$d. per oz
5s per lb is $\frac{3}{4}$d.×5 per oz i.e. 3$\frac{3}{4}$d. per oz.

In the same way the price of 1 lb. can be found given the price of 1 oz

3$\frac{1}{2}$d. per oz. is $\frac{14s}{3}$ per lb i e. 4s 8d per lb.

5$\frac{1}{4}$d. per oz. is $\frac{21s}{3}$ per lb i e 7s per lb.

5. As there are 112 lb. in 1 cwt

1 cwt. at 1d per lb. costs 9s. 4d.
1 cwt at 2d. per lb. costs 9s 4d ×2, i e. 18s 8d.
1 cwt. at 5d. per lb. costs 9s. 4d ×5, i e. £2 6s. 8d.
1 cwt. at ½d. per lb costs 4s. 8d.
1 cwt. at ¼d per lb. costs 2s. 4d
1 cwt. at 2½d per lb costs 4s. 8d.×5, i e. £1 3s. 4d
1 cwt. at 1¾d. per lb. costs 2s. 4d.×7, i.e. 16s. 4d.

Then follow the variations of this rule

2 cwt. at 1d. per lb is the same as 1 cwt. at 2d per lb
3½ cwt at 2d. per lb. is the same as 1 cwt at 7d. per lb.

Then, because ¼d. per lb is 2s. 4d. per cwt., the number of farthings per lb. multiplied by 2⅓ will give the number of shillings in the price of 1 cwt

Example: 3¾d. per lb = 15 farthings per lb
Price per cwt. = (15×2⅓)s.
= 35s.

6. There are 2240 lb. in 1 ton.

2240=960+960+⅓ of 960.
But 960 farthings=£1.
Hence 1 ton at 1½d. per lb. costs
£6+£6+£2, i.e. £14
1 ton at 6¼d. per lb. costs
£25+£25+⅓ of £25, i.e. £58 6s 8d.

Some of these methods are easier than others, and may be introduced earlier. Average children can readily understand 1, 2 and 3. The first simple statements in 5 present no difficulty, but when the others should be introduced is a matter for each teacher to settle for herself, bearing in mind the capacity of the class.

Time

This is a very important measure because its use is universal. It cannot be regarded from the purely arithmetical standpoint. Knowledge of time is general knowledge which all normal people should possess In history lessons children can follow the development of the measurement of time from sticks and shadows, hour glasses and sundials, to the first clocks and watches, and lastly to the electrically synchronised clocks in modern department stores. Then the whole subject of the measurement of time is closely connected with geography and astronomy: the year, leap year, the lunar month, day and night, all will be introduced in geography lessons. The solar day, the solar year, and the lunar month may be called natural divisions of time; while the hour, the week and the civil month, although of ancient use, are purely conventional divisions

In a child's mind time is connected with the clock, and the first lessons on time should be given with the aid of a clock face and "movable" hands Most children learn to tell the time quite easily in spite of the Roman numerals found on most clocks Exercises such as the following might be given.

1. Copy the figures from the clock face, and write beside each the ordinary number for which it stands.
   Have more than one clock face and let children notice the ways in which 4 may be written—4, IV, or IIII
2. What figures on the clock face stand for, 3, 7, 6, 8, 9, 5, 10, 11, 12, 4?
3. Find out from the clock face how many minutes are in (a) 1 hour; (b) ½ hour; (c) ¼ hour; (d) ¾ hour.
4. Set the hands of the clock to show half past 4; ten past 3; 5 to 12, a quarter to 9; a quarter past 9.
5. Write down the times which the teacher makes the clock face show.

Children soon learn that 60 minutes equal 1 hour Then if a clock which has a "seconds" hand is examined they can discover that 60 seconds equal 1 minute To complete the table they must learn that 24 hours make 1 day, and 7 days 1 week. The table is then complete from seconds to weeks. Careful teaching is necessary to get the children to recognise the connection between time as used in conversation, and that shown on railway and bus time-tables.

Half past eight	=	8 30.
Twenty to nine	=	8 40.
A quarter to twelve	=	11 45.
Five and twenty past 4	=	4 25.—and so on.

To make children familiar with written and spoken time, it is a good plan to make a large time-table of a simple kind on a wall sheet or to secure a local bus time-table, and give oral exercises from it.

Great Western Railway

Down.	a m.	a m.	p m.	Up.	a.m.	p.m	p m
Birmingham -	8 25	11 15	6 15	Liverpool - -	8.53	12 38	5.10
Wolverhampton -	8 55	11.39	6 40	Birkenhead -	9 5	1 5	5.25
		p m					
Shrewsbury -	9 33	12 15	7 16	Chester - -	9 41	1 40	6 0
Chester - -	10 40	1 18	8 25	Shrewsbury -	10 56	2 43	7 0
Birkenhead -	11 15	1 50	9 4	Wolverhampton -	11.35	3 23	—
Liverpool - -	11 22	2.2	9.12	Birmingham -	12 1	3 48	7 52

1. At what time does the first train leave Birmingham? (At five and twenty past 8)
2. At what time does it arrive at Wolverhampton? (At five to nine).
3. When does it arrive at Chester? (At twenty to eleven).
4. When does it arrive at Birkenhead? (At a quarter past eleven).

If oral practice of this type is given for a few minutes for several mornings, there will soon be no difficulty in recognising the identity between "the time" and time-table time. As the children progress the wall sheet or printed time-table can be used to furnish other exercises.

1. How long does the 8.25 a.m. train from Birmingham take to reach Wolverhampton? Shrewsbury?
2. How long does the 11.15 a.m. train take to reach these two stations? Which train is the faster?
3. If the 6.15 p.m. from Birmingham was 15 minutes late at Wolverhampton, what time did it arrive there?
4. Tom arrived at Birkenhead at 11.15 a.m. His friend Jim arrived at 1.50 p.m. How long had Tom to wait for Jim?

Any time-tables can be used in this way for exercises. Children who live at the seaside or along a tidal river bank, can use tide-tables for exercises. Many children have pocket books, and small advertisement calendars which contain such useful data as the times of sunrise and sunset, lighting up, high water at London Bridge, etc., and from these calendars many interesting and useful calculations can be made.

The larger units of time have to be learned.

52 weeks = 1 year
365 days = 1 year
366 days = 1 leap year

Later, the more difficult items must be taught.

4 weeks = 1 lunar month
13 lunar months = 1 year
12 calendar months = 1 year

Perhaps the easiest way to teach the number of days in each month is to teach the old rhyme:

"Thirty days hath September,
April, June and November,
All the rest have thirty-one,
Excepting February alone,
Which hath twenty-eight days clear,
But Leap Year coming once in four
Gives February one day more."

Leap Year is found by dividing the year by 4, or the century by 400. If there is no remainder the year or century is a Leap Year Thus 1600 was a Leap Year, but not 1700, 1800 or 1900. The year 2000 will be a Leap Year.

There are various other items of knowledge which must be introduced at the discretion of the teacher.

A *century* is one hundred years.
Noon is 12 o'clock midday.
A.M. (from the Latin ante meridiem) means before noon.
P M. (from the Latin post meridiem) means after noon.
6 a.m. is 6 o'clock in the morning, 3 p.m. is 3 o'clock in the afternoon; 9 p.m. is 9 o'clock at night.

A *lunar month* is a moon month. It is reckoned as the period between two following times of new moon. A lunar month is generally taken as 28 days, although the real lunar month is 29 days, 12 hr. 44 min. 2·8 sec., or 29½ days very nearly.

A *calendar month* varies according to the number of days in the month as set out in the calendar, which is a table of months, days, seasons, feasts, etc. A calendar is sometimes called an *almanac.*

There are 4 *quarter days* in a year: Lady Day, March 25th, Midsummer Day, June 24th; Michaelmas Day, September 29th; Christmas Day, December 25th.

The nearest approach to these days in Scotland are the *term days*,—Candlemas, February 2nd; Whitsunday, May 15th; Lammas, August 1st; Martinmas, November 11th.

There are various calendar exercises which can be given.

Let the children copy and complete a calendar for a month.

JANUARY (has 31 days)

Sunday		4			
Monday		5			
Tuesday					
Wednesday					
Thursday	1				
Friday	2				
Saturday	3				

1. If the first of January is a Thursday, give the dates of the other Thursdays in January.
2. If the 4th of January is a Sunday, give the dates of the other Sundays in January.
3. How many Mondays are in January on this calendar? how many Saturdays?
4. What is the date of Christmas Day?
5. If Christmas Day is a Thursday, what day of the week is New Year's Day?
6. 1912 was a Leap Year. Write down the dates of all the Leap Years since then
7. How many days are there from 23rd July to August 6th. (Note that only one of the two given dates should be included in the reckoning.)
8. How many days are there from 10th May to 2nd June?
9. What are the names of the months in the first quarter of the year? 2nd quarter? 3rd quarter? last quarter?
10. How many days are in December and January together?
11. How many days are in May and June together?
12. How many days are in the first quarter of the year?

Questions on time should be included regularly in the daily oral work and mental drill

1. How many seconds are in 4 min.? 1½ min ? 2¼ min.? 1¾ min.?
2. Express in hours: 2 days; 1½ days, 5 days; 2¼ days
3. How many minutes are in 3 hr.? 2½ hr.? 1¼ hr.? 1¾ hr.?

4. Express in weeks: 2 yr, $1\frac{1}{2}$ yr; 3 yr., $3\frac{1}{2}$ yr.
5. How many hours from 8 a.m. to 11 a.m.? from 10 a.m. to 1 p.m.? from 11 a.m. to 4 p.m.?
6. How long from 10 30 a.m to 12 noon? from 11 15 a.m to 1 p.m.? from 6 30 p.m. to 8.15 p.m.?
7. Express 48 hours in days, 96 hours in days, 180 minutes in hours; 300 seconds in minutes
8. If you took 3 minutes to do a sum, how many sums could you do in $\frac{1}{2}$ hour?
9. If you have 15 minutes for mental arithmetic each day, how many hours and minutes do you have in a week?
10. How far can a motor car go in $2\frac{1}{2}$ hours travelling at 40 miles an hour?
11. If you go into school at 8 50 a.m. and come out at 12 noon, how many hours and minutes do you spend there?
12. If you go into school at 1 45 p.m and come out at 4 p.m, how long do you spend there?

As with the other tables, a certain amount of reduction must be done as a preliminary to teaching the four rules. The four rules can be taught in any of the ways previously demonstrated

Capacity

This table falls into two sections, the first for liquids, and the second for dry goods. Probably it is the easiest table of all to remember. The only items of any great importance to younger children are 2 pints equal 1 quart, 4 quarts equal 1 gallon The children should also know that 8 pints are one gallon The other section of the table which applies to dry measure can be left until later, but even with that there is little difficulty

If there is not a set of measures in the school with which some preliminary practical work can be done, it is easy to borrow a pint and a quart milk bottle, or jugs from home Water suggests itself at once as a cheap and easily obtainable medium for measuring. It is apt to be "messy," so it is as well to borrow some large tin trays and have all practical work done on these, or else wait for a fine day and have the lesson in the playground Here it is also possible to use one-gallon and two-gallon watering-cans. As a rule little practical work is needed in capacity. The visits of the milkman twice daily to most houses make children familiar with half pints, pints and quarts Children whose homes the milkman does not visit daily are equally familiar with these quantities through their visits to the dairy to buy milk in bottles. They may not be able to recognise gallons quite so readily, although two-gallon tins of petrol are a common enough sight, and watering-cans and pails are made in one-gallon and two-gallon sizes. Plenty of practice should be given in estimating the capacity of common utensils such as jugs, glasses, bottles, kettles and saucepans.

Later, the connection between liquids and weight should be noted There can be little doubt that in olden times a pint measure was a vessel which held a pound weight of an article, and a gallon held 8 pounds. As the specific gravity of articles differs, the measures of capacity for them would also differ. An attempt was made in the reign of Edward I to get over this difficulty, but it was not successful, and the principle of having the same gallon for corn, wine and ale was not definitely accepted until the passing of the "Weights and Measures Act 1824." The following rhyme is usually learned to establish the connection between weight and capacity.

> "A pint of pure water
> Weighs one pound and a quarter."

Therefore a gallon of water weighs 10 lb.

As with the other weights and measures, children will become used to dealing with the units if they are given frequent oral and mental practice.

1. Mother bought a pint of milk a day. How many pints a week was this? How many quarts?
2. A baby drinks $\frac{1}{4}$ pt of milk at each feed How many feeds will he have to drink a quart?
3. 8 boys were each to have a $\frac{1}{2}$ pt. glass of lemonade How many quarts were needed?

   Then quick mental drill can be given·

4. How many pints are in 2 qt.? 1 gal.? $\frac{1}{2}$ gal.? 2 gal.?
5. How many quarts are in 1 gal.? $\frac{1}{2}$ gal.? 2 gal.?
6. Change 8 quarts to gallons; 8 pints to quarts; 16 pints to gallons.

With capacity, as with the other measures, addition, subtraction, multiplication and division have to be done. Very little mechanical work of this kind is needed. Care should be taken that exercises in concrete form deal with real quantities and everyday experiences.

The second section of the table which will be taught later may be dealt with in much the same way The items to be learnt are 2 gallons one peck, 4 pecks one bushel, 8 bushels one quarter.

Quarters, bushels and pecks are used for such goods as corn, flour, seeds, vegetables In some districts fruit is sold by capacity, e.g. a pint of gooseberries, a quart of currants, a gallon of plums, a peck or bushel of apples Fish merchants sell shrimps and winkles by the pint.

FRACTIONS

Children should be familiar with ordinary fractions such as $\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{4}$, $\frac{1}{3}$, $\frac{1}{6}$, $\frac{1}{5}$, $\frac{1}{8}$, before any formal work in fractions is attempted. They will know $\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{4}$, because they know $\frac{1}{2}$d., $\frac{1}{4}$d., $\frac{3}{4}$d Table practice requiring children to find fractions of numbers should be given regularly.

1. Find $\frac{1}{2}$ of 22; $\frac{1}{3}$ of 24; $\frac{1}{4}$ of 48; $\frac{1}{5}$ of 45, etc.

   Money tables should be dealt with in the same way:

2. Find $\frac{1}{2}$ of 1s ; $\frac{1}{3}$ of 1s ; $\frac{1}{4}$ of 1s ; $\frac{1}{6}$ of 1s.
3. Find $\frac{1}{2}$ of 2s. 6d.; $\frac{1}{3}$ of 2s. 6d ; $\frac{1}{4}$ of 2s 6d ; $\frac{1}{5}$ of 2s 6d.
4. Find $\frac{1}{2}$ of £1; $\frac{1}{4}$ of £1; $\frac{1}{5}$ of £1; $\frac{1}{8}$ of £1.

   The various tables of weights and measures can be treated similarly:

5. How many inches in $\frac{1}{2}$ yd.? $\frac{1}{4}$ yd.? $\frac{3}{4}$ yd ? $\frac{1}{3}$ yd.?
6. How many minutes in $\frac{1}{2}$ hr ? $\frac{1}{3}$ hr.? $\frac{1}{4}$ hr ? $\frac{2}{3}$ hr.?
7. How many yards in $\frac{1}{2}$ ml ? $\frac{1}{4}$ ml ? $\frac{3}{4}$ ml.? $\frac{1}{8}$ ml.?
8. How many cwt in $\frac{1}{4}$ ton? $\frac{1}{2}$ ton? $\frac{1}{5}$ ton? $\frac{1}{10}$ ton.?

In this way children will become familiar with fractions, and the teacher will find no serious difficulty in teaching the meaning and the writing of simple fractions

Practical work is of great value. For a first simple exercise give each child a sheet of paper (brightly coloured if possible), let them fold it into halves and write clearly the result in the exercise book:—"There are 2 equal pieces; each is one half or $\frac{1}{2}$." Let the children fold the papers into quarters and write: "There are 4 equal pieces, each is one quarter

or $\frac{1}{4}$." Continue in this way and demonstrate eighths and sixteenths, and in each case write the result. See that the children clearly understand that the *whole* is divided into a number of *equal* parts. Other useful facts can then be shown from this exercise

In $\frac{1}{2}$ there are 2 quarters, $\frac{2}{4}$
In $\frac{1}{4}$ there are 2 eighths, $\frac{2}{8}$
In $\frac{1}{8}$ there are 2 sixteenths, $\frac{2}{16}$
In $\frac{1}{2}$ there are 4 eighths, $\frac{4}{8}$
In $\frac{1}{2}$ there are 8 sixteenths, $\frac{8}{16}$
In $\frac{1}{4}$ there are 4 sixteenths, $\frac{4}{16}$

$\frac{1}{2}$ of $\frac{1}{2}=\frac{1}{4}$
$\frac{1}{2}$ of $\frac{1}{4}=\frac{1}{8}$
$\frac{1}{2}$ of $\frac{1}{8}=\frac{1}{16}$
$\frac{1}{4}$ of $\frac{1}{2}=\frac{1}{8}$
$\frac{1}{4}$ of $\frac{1}{4}=\frac{1}{16}$
$\frac{1}{8}$ of $\frac{1}{2}=\frac{1}{16}$

Thirds, sixths and twelfths can be learned either by using cardboard coins, or a foot ruler. If coins are used, the children should have out 12 pennies, that is one shilling. Then, using the shilling as the unit, and counting out their pennies, they can learn the following useful facts

In 1 whole (shilling) there are $\frac{12}{12}$
In a half there are six twelfths, i.e. $\frac{1}{2}=\frac{6}{12}$
In a quarter there are three twelfths; i.e. $\frac{1}{4}=\frac{3}{12}$
In a third there are four twelfths, i.e. $\frac{1}{3}=\frac{4}{12}$
In a sixth there are two twelfths; i.e. $\frac{1}{6}=\frac{2}{12}$
In a third there are two sixths; i.e. $\frac{1}{3}=\frac{2}{6}$

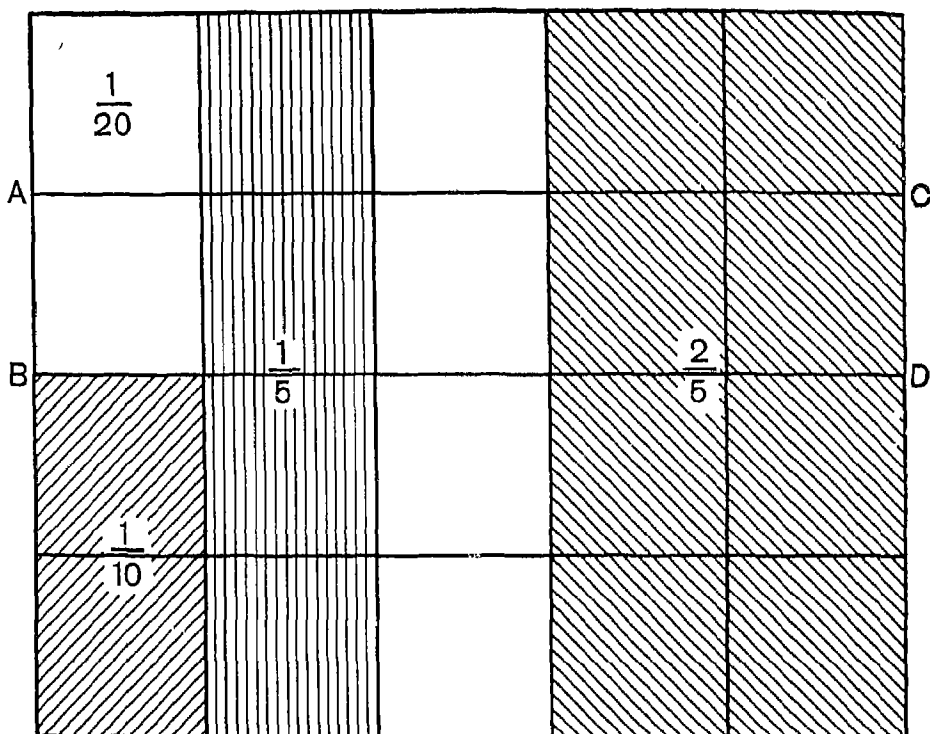
Some simple addition can also be shown by counting out the coins:

$\frac{1}{3}+\frac{1}{4}=\frac{7}{12}$
$\frac{1}{2}+\frac{1}{4}=\frac{9}{12}=\frac{3}{4}$
$\frac{1}{2}+\frac{1}{3}=\frac{10}{12}=\frac{5}{6}$
$\frac{1}{2}+\frac{1}{6}=\frac{8}{12}=\frac{2}{3}$
$\frac{1}{6}+\frac{1}{12}=\frac{3}{12}=\frac{1}{4}$

Subtraction can be shown in a similar manner:

$\frac{1}{3}-\frac{1}{4}=\frac{1}{12}$
$\frac{1}{2}-\frac{1}{3}=\frac{2}{12}=\frac{1}{6}$
$\frac{1}{2}-\frac{1}{6}=\frac{4}{12}=\frac{1}{3}$
$\frac{1}{2}-\frac{1}{12}=\frac{5}{12}$—and so on.

If, for this lesson, rulers are preferred to coins, the foot should be the unit employed, and the inch markings will be the twelfths. All the facts which were demonstrated by the use of coins, can be demonstrated just as clearly and easily by the use of inches and one foot

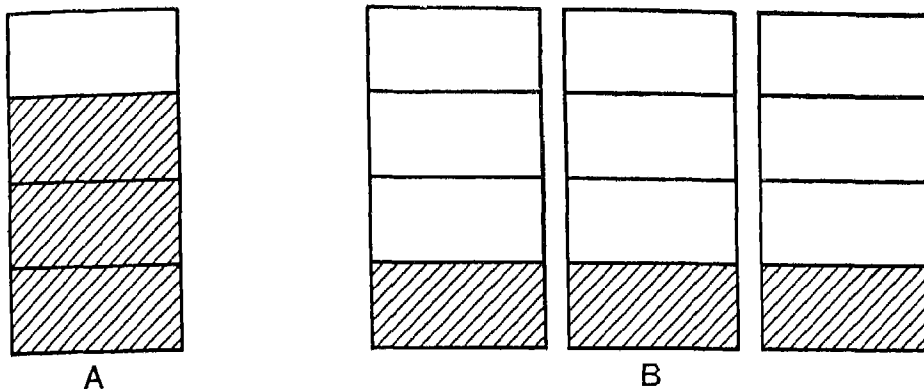
Fifths and tenths can be learned most conveniently from a ruler, and the unit employed may be an inch or a centimetre. Squared paper can be used to show any fractions.

Rectangle ABCD $= \frac{1}{4}$

A diagram similar to the above can be drawn by each child on squared paper, and then the answers to a set of questions can be written underneath.

1. How many twentieths are in 1 whole rectangle?
2. How many tenths are in 1 whole?
3. How many fifths are in 1 whole?
4. How many twentieths are in $\frac{1}{10}$, $\frac{1}{5}$, $\frac{1}{4}$, $\frac{1}{2}$?
5. How many tenths are in $\frac{1}{5}$, $\frac{1}{2}$?
6. How many twentieths are in $\frac{2}{5}$, $\frac{3}{5}$, $\frac{4}{5}$?
7. How many tenths are in $\frac{2}{5}$? $\frac{3}{5}$? $\frac{4}{5}$?
8. How many twentieths are in $\frac{1}{20}+\frac{1}{10}$?
9. How many tenths are in $\frac{1}{5}+\frac{1}{10}$?
10. How many twentieths are in $\frac{1}{5}+\frac{1}{4}$?

Many other questions of a similar type can be set.

The two meanings which a fraction such as $\frac{3}{4}$ has, can be shown by a simple diagram on squared paper.

A   B

A $\frac{3}{4}$ means 1 whole divided into 4 equal parts, and 3 of those parts taken.

B $\frac{3}{4}$ means 3 wholes divided into 4 equal parts, and 1 part taken from each whole

The diagram shows that whichever meaning is taken the value is the same

Hence $\frac{3}{4}$ of $1 = \frac{1}{4}$ of 3.

It is a waste of time and effort to start teaching technical terms such as "numerator" and "denominator." The meanings of these words will be acquired incidentally by the child while doing concrete work. There are certain operations which the child must be able to perform easily before proceeding very far with fractions. The first of these is changing mixed numbers to improper fractions, and improper fractions to mixed numbers.

Exercises such as the following should be worked, and plenty of oral practice of a similar kind should be given.

Express as follows

1. State $4\frac{1}{2}$, $7\frac{1}{2}$, $11\frac{1}{2}$, $26\frac{1}{2}$ as halves
2. State $3\frac{1}{4}$, $5\frac{1}{4}$, $12\frac{3}{4}$, $16\frac{1}{4}$ as quarters.
3. State $1\frac{1}{8}$, $3\frac{3}{8}$, $5\frac{5}{8}$, $6\frac{7}{8}$ as eighths.
4. State $1\frac{1}{16}$, $3\frac{7}{16}$, $5\frac{1}{16}$, $6\frac{11}{16}$ as sixteenths.
5. Change the mixed numbers to improper fractions: $8\frac{1}{2}$, $7\frac{3}{4}$, $4\frac{3}{16}$, $3\frac{5}{8}$, $2\frac{15}{16}$, $8\frac{7}{8}$.
6. State the improper fractions as mixed numbers: $\frac{5}{2}$, $\frac{7}{4}$, $\frac{13}{8}$, $\frac{19}{16}$, $\frac{29}{4}$, $\frac{63}{8}$.

The next fact which must be learned is that a fraction can be expressed in a variety of ways. It is the basis of all such work as reducing to lowest terms and cancelling; we employ it in addition and subtraction, and later in ratio, equations, simplifications, etc

The following exercises are of the type which should be given first to inculcate this fact

Copy and complete:

1. $\frac{1}{2} = \frac{}{4} = \frac{}{6} = \frac{}{8} = \frac{}{10} = \frac{}{12} = \frac{}{16}$.
2. $\frac{1}{4} = \frac{}{8} = \frac{}{12} = \frac{}{16} = \frac{}{20} = \frac{}{40} = \frac{}{80}$.
3. $\frac{3}{6} = \frac{}{2}$, $\frac{6}{8} = \frac{}{4}$, $\frac{4}{10} = \frac{}{5}$; $\frac{9}{12} = \frac{}{4}$.
4. $\frac{6}{9} = \frac{}{3}$, $\frac{14}{16} = \frac{}{8}$; $\frac{8}{12} = \frac{}{3}$, $\frac{12}{18} = \frac{}{3}$.
5. Express in their simplest forms

   $\frac{4}{6}$; $\frac{9}{12}$, $\frac{7}{14}$, $\frac{10}{16}$; $\frac{9}{6}$; $\frac{14}{10}$, $\frac{22}{16}$; $\frac{30}{12}$.

Facility in this work will never be obtained unless plenty of practice is given. The teacher can give oral work, and can write dozens of examples on the blackboard.

Encourage children to use the highest factor they can find when cancelling.

When this preliminary work is understood and can be done easily the children are ready for addition and subtraction of fractions. The first examples should be simple, and definite instructions should be given as to what is to be done.

Write all the fractions as eighths, then add:

1. (*a*) $\frac{1}{4}+\frac{3}{8}$; (*b*) $\frac{1}{2}+\frac{5}{8}$; (*c*) $\frac{3}{4}+\frac{1}{8}$; (*d*) $\frac{7}{8}+\frac{1}{2}$.
2. (*a*) $\frac{1}{2}+\frac{1}{4}+\frac{3}{8}$; (*b*) $\frac{3}{4}+\frac{1}{8}+\frac{1}{2}$; (*c*) $\frac{1}{2}+\frac{3}{4}+\frac{7}{8}$; (*d*) $\frac{1}{4}+\frac{1}{2}+\frac{5}{8}$.

Write all the fractions as sixteenths, then add:

3. (*a*) $\frac{1}{2}+\frac{1}{16}$; (*b*) $\frac{1}{4}+\frac{3}{16}$, (*c*) $\frac{3}{8}+\frac{9}{16}$; (*d*) $\frac{3}{4}+\frac{15}{16}$.
4. (*a*) $\frac{1}{4}+\frac{3}{16}+\frac{1}{2}$; (*b*) $\frac{5}{8}+\frac{1}{4}+\frac{5}{16}$, (*c*) $\frac{3}{4}+\frac{3}{8}+\frac{3}{16}$; (*d*) $\frac{11}{16}+\frac{7}{8}+\frac{1}{2}$

Write all the fractions as tenths, then add

5. (*a*) $\frac{1}{2}+\frac{1}{5}$; (*b*) $\frac{2}{5}+\frac{3}{10}$; (*c*) $\frac{7}{10}+\frac{4}{5}$; (*d*) $\frac{1}{2}+\frac{9}{10}$.
6. (*a*) $\frac{1}{10}+\frac{1}{2}+\frac{2}{5}$; (*b*) $\frac{1}{2}+\frac{3}{5}+\frac{3}{10}$; (*c*) $\frac{7}{10}+\frac{1}{2}+\frac{1}{5}$; (*d*) $\frac{4}{5}+\frac{9}{10}+\frac{3}{5}$.

Write all the fractions as eighths, then subtract:

7. (*a*) $\frac{1}{2}-\frac{3}{8}$; (*b*) $\frac{3}{8}-\frac{1}{4}$; (*c*) $\frac{7}{8}-\frac{1}{2}$; (*d*) $\frac{3}{4}-\frac{5}{8}$

Write all the fractions as sixteenths, then subtract:

8. (*a*) $\frac{1}{2}-\frac{5}{16}$, (*b*) $\frac{3}{4}-\frac{3}{16}$; (*c*) $\frac{7}{8}-\frac{11}{16}$; (*d*) $\frac{15}{16}-\frac{5}{8}$.

Write all the fractions as tenths, then subtract·

9. (*a*) $\frac{1}{2}-\frac{1}{5}$, (*b*) $\frac{7}{10}-\frac{1}{2}$; (*c*) $\frac{4}{5}-\frac{3}{10}$, (*d*) $\frac{9}{10}-\frac{2}{5}$.
10. To make 1 yard what fraction must be added to (*a*) $\frac{1}{6}$ yd.; (*b*) $\frac{2}{3}$ yd ; (*c*) $\frac{3}{8}$ yd., (*d*) $\frac{7}{12}$?

Through working exercises such as the above, children will realise what they are required to do when adding or subtracting fractions. The exercises are so simple that few children will find any difficulty in giving the correct answers. They will thus acquire confidence, and be ready to proceed to examples in which they must decide for themselves what is to be done.

Change to eighths or sixteenths as necessary, and find the sum·

1. (*a*) $\frac{1}{2}+\frac{7}{8}$; (*b*) $\frac{3}{4}+\frac{5}{8}$, (*c*) $\frac{7}{16}+\frac{1}{4}$; (*d*) $\frac{7}{8}+\frac{5}{16}$.
2. (*a*) $\frac{1}{4}+\frac{5}{16}+\frac{7}{8}$; (*b*) $\frac{3}{8}+\frac{9}{16}+\frac{3}{4}$; (*c*) $\frac{1}{2}+\frac{13}{16}+\frac{1}{4}$; (*d*) $\frac{5}{8}+\frac{11}{16}+\frac{3}{4}$.

Change to sixths, tenths or twelfths, as necessary, and find the sum.

3. (*a*) $\frac{1}{3}+\frac{1}{2}$; (*b*) $\frac{1}{4}+\frac{5}{6}$; (*c*) $\frac{1}{2}+\frac{3}{10}$; (*d*) $\frac{4}{5}+\frac{7}{10}$.
4. (*a*) $\frac{3}{4}+\frac{1}{6}+\frac{1}{3}$; (*b*) $\frac{1}{2}+\frac{3}{5}+\frac{7}{10}$; (*c*) $\frac{2}{3}+\frac{5}{6}+\frac{1}{2}$; (*d*) $\frac{5}{6}+\frac{2}{3}+\frac{3}{4}$.

Work by bringing the fractions to common denominators

5. (*a*) $\frac{5}{8}-\frac{1}{4}$; (*b*) $\frac{1}{2}-\frac{3}{10}$; (*c*) $\frac{7}{8}-\frac{3}{4}$, (*d*) $\frac{2}{3}-\frac{1}{6}$
6. (*a*) $\frac{2}{3}-\frac{5}{12}$; (*b*) $\frac{4}{5}-\frac{1}{2}$, (*c*) $\frac{15}{16}-\frac{5}{8}$, (*d*) $\frac{7}{12}-\frac{1}{4}$
7. (*a*) $2\frac{5}{8}+\frac{1}{2}$; (*b*) $\frac{5}{6}+3\frac{1}{3}$; (*c*) $4\frac{1}{4}+\frac{7}{8}$; (*d*) $2\frac{3}{4}+1\frac{9}{16}$
8. (*a*) $1\frac{1}{2}-\frac{5}{8}$, (*b*) $2\frac{1}{4}-\frac{7}{10}$, (*c*) $1\frac{9}{10}-\frac{2}{5}$; (*d*) $3\frac{1}{3}-\frac{5}{6}$

Mixed numbers can be introduced at any time in addition as they present no new difficulty; the whole numbers and fractions are added separately.

It will be necessary to explain how an example such as $3\frac{1}{4}-\frac{7}{16}$ is worked.

$3\frac{1}{4}-\frac{7}{16}$ $=3\frac{4}{16}-\frac{7}{16}$ $=2\frac{13}{16}$	We cannot take $\frac{7}{16}$ from $\frac{4}{16}$, so we take a whole number from the 3 $\frac{7}{16}$ from 1 leaves $\frac{9}{16}$, and $\frac{9}{16}+\frac{4}{16}=\frac{13}{16}$ The 2 whole numbers which remain give the final result $2\frac{13}{16}$.

Some teachers prefer to have it set out as follows:

$$
\begin{aligned}
& 3\frac{1}{4}-\frac{7}{16} \\
= & 3\frac{4}{16}-\frac{7}{16} \\
= & 2\frac{20}{16}-\frac{7}{16} \\
= & 2\frac{13}{16}
\end{aligned}
$$

Children should be encouraged to set out fractions carefully There are no sums which present a worse appearance than fractions done in a slovenly, haphazard manner. Errors are frequently made through careless setting out.

Ways of setting out.

A.

$$
\begin{aligned}
& \frac{1}{2}+\frac{3}{5}+\frac{7}{10} \\
= & \frac{5}{10}+\frac{6}{10}+\frac{7}{10} \quad \text{or} \quad \frac{5+6+}{10} \\
= & \frac{18}{10} \\
= & 1\frac{8}{10} \\
= & 1\frac{4}{5}
\end{aligned}
$$

B

	10
$\frac{1}{2}$	5
$\frac{3}{5}$	6
$\frac{7}{10}$	7

$\frac{18}{10}=1\frac{8}{10}=1\frac{4}{5}$

C. Excellent work can be done with an arrangement similar to that of the pence column in the addition of money. The addition is also vertical as in arrangement B.

$$
\begin{aligned}
& 1\frac{1}{2}=1\frac{5}{10} \\
& 2\frac{3}{5}=2\frac{6}{10} \\
& \frac{7}{10}=\frac{7}{10} \\
\text{Sum} \quad & =3\frac{18}{10} \\
& =4\frac{8}{10} \\
& =4\frac{4}{5}
\end{aligned}
$$

Method B is that in use on the Continent. The L C.M is placed at the top of the column. The addition is easier because it is vertical, and the plus sign is not repeated.

Plenty of practice should be given in well-graded examples. Once the method of addition and subtraction has been taught, facility depends entirely upon the amount of practice given. It is a good plan, once fractions have been taught, to begin the arithmetic lesson each morning by putting one fraction sum on the blackboard, and having this worked by the whole class before proceeding to other work. This plan is effective with decimals, long division, or any type of sum which children find difficult. It is amazing to note the progress made by quite dull children in a week or two, by this means.

The methods of doing multiplication and division of fractions are easily learned by children, but the explanation of these processes is not so readily understood. It is necessary, however, at one stage or another to give some reasonable explanation. Probably the best approach is through simple examples which gradually lead the children to understand the reason for the rules of working. Let children have their rulers and work an exercise such as the following:

Compare the answers in (*a*) and (*b*).

1. What is (*a*) $\frac{1}{2}$ of 4 in. (*b*) $\frac{1}{2}$ in. $\times 4$?
2. What is (*a*) $\frac{1}{4}$ of 12 in (*b*) $\frac{1}{4}$ in. $\times 12$?
3. What is (*a*) $\frac{2}{3}$ of 6 in. (*b*) $\frac{2}{3}$ in $\times 6$?

Show children that $\frac{1}{2}$ in. $\times 4$ means $\frac{1}{2}$ in. $+\frac{1}{2}$ in. $+\frac{1}{2}$ in. $+\frac{1}{2}$ in., i.e. 2 in. And that $\frac{2}{3}$ in $\times 6$ means $\frac{2}{3}$ in. $+\frac{2}{3}$ in $+\frac{2}{3}$ in $+\frac{2}{3}$ in. $+\frac{2}{3}$ in $+\frac{2}{3}$ in., i e. $\frac{12}{3}$ in. or 4 in

Still using the rulers work the following:

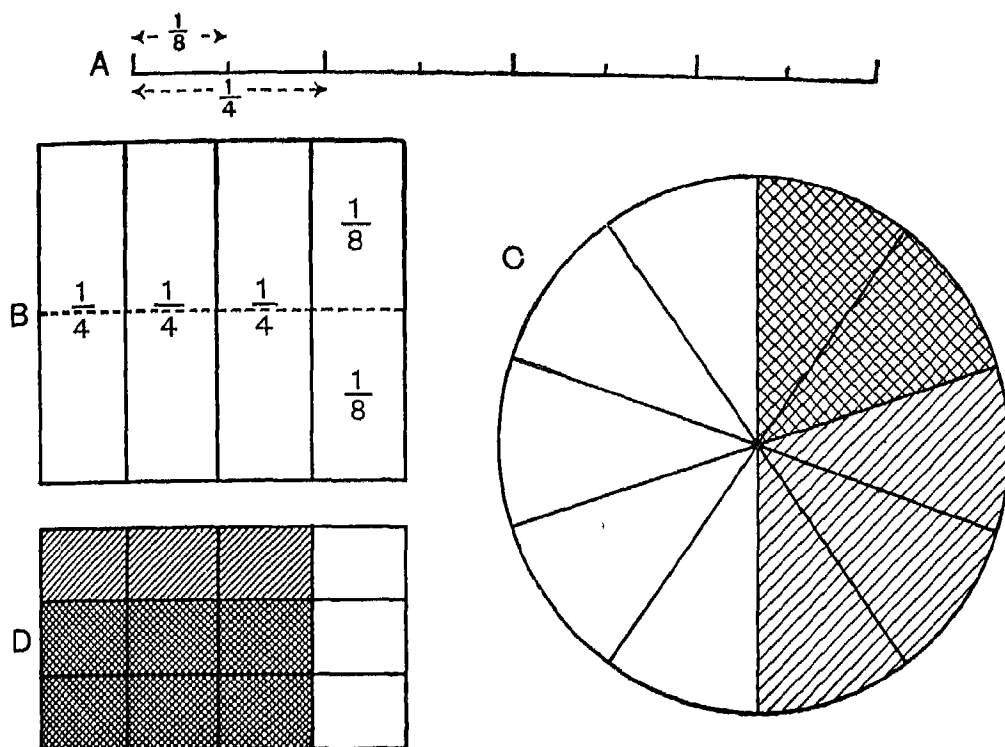
4. (*a*) $\frac{1}{2}$ of $\frac{1}{2}$ in ; (*b*) $\frac{1}{2}$ of $\frac{1}{4}$ in ; (*c*) $\frac{1}{2}$ of $\frac{1}{5}$ in.; (*d*) $\frac{1}{2}$ of $\frac{1}{3}$ in
5. (*a*) $\frac{1}{2}$ of $\frac{3}{4}$ in.; (*b*) $\frac{1}{2}$ of $\frac{3}{8}$ in.; (*c*) $\frac{1}{2}$ of $\frac{3}{5}$ in , (*d*) $\frac{1}{2}$ of $\frac{2}{3}$ in.
6. (*a*) $\frac{1}{2}$ of $1\frac{1}{2}$ in.; (*b*) $\frac{1}{2}$ of $1\frac{1}{4}$ in., (*c*) $\frac{1}{2}$ of $1\frac{1}{3}$ in.; (*d*) $\frac{1}{2}$ of $1\frac{1}{5}$ in.

An important fact for children to realise is that the sign " $\times$ " and "of" are closely connected The first three examples are designed to show this.

7. What length is (*a*) 3 times $\frac{1}{2}$ in ; (*b*) 5 times $\frac{1}{4}$ in.; (*c*) 6 times $\frac{3}{4}$ in.?

Write as mixed numbers the answers to the following:

8. (*a*) $\frac{1}{3}\times 4$; (*b*) $\frac{2}{3}\times 5$; (*c*) $\frac{4}{5}\times 2$, (*d*) $\frac{3}{8}\times 3$
9. (*a*) $\frac{5}{6}\times 5$, (*b*) $\frac{5}{8}\times 4$; (*c*) $\frac{4}{7}\times 6$; (*d*) $\frac{5}{12}\times 8$
10. (*a*) $1\frac{1}{3}\times 4$; (*b*) $1\frac{3}{5}\times 2$; (*c*) $2\frac{1}{8}\times 7$; (*d*) $3\frac{3}{7}\times 3$
11. What is (*a*) $\frac{1}{4}$ of $\frac{1}{3}$, (*b*) $\frac{1}{4}$ of $\frac{2}{3}$?
12. What is (*a*) $\frac{1}{4}$ of $\frac{1}{4}$, (*b*) $\frac{1}{4}$ of $\frac{3}{4}$?

Let children draw lines or rectangles, or use the ruler edge to show that $\frac{1}{2}$ of $\frac{1}{4}=\frac{1}{8}$, $\frac{1}{4}$ of $\frac{1}{2}=\frac{1}{8}$; $\frac{1}{3}$ of $\frac{1}{2}=\frac{1}{6}$, $\frac{1}{4}$ of $\frac{3}{4}=\frac{3}{16}$ etc.

A. To show that $\frac{1}{2}$ of $\frac{1}{4}=\frac{1}{8}$

B. To show that $\frac{1}{2}$ of $\frac{1}{4}=\frac{1}{8}$

C. To show that $\frac{2}{5}$ of $\frac{1}{2}=\frac{2}{10}=\frac{1}{5}$

D. To show that $\frac{2}{3}$ of $\frac{3}{4}=\frac{1}{2}$

From diagram D we see that by taking $\frac{2}{3}$ of $\frac{3}{4}$ we are taking $\frac{6}{12}$ of the whole and $\frac{6}{12}$ equals $\frac{1}{2}$. Or to explain it another way, if we take $\frac{1}{3}$ of $\frac{3}{4}$, we have $\frac{1}{4}$, and if we take two such parts we have $\frac{2}{4}$ or $\frac{1}{2}$, so that $\frac{2}{3}$ of $\frac{3}{4}=\frac{1}{2}$. When other fractions have been demonstrated in a similar way the rule can be deduced. Multiply the numerators together for the new numerator, and multiply the denominators together for the new denominator. The answers that were obtained by drawing can now be checked by working, and children can be shown how cancelling simplifies the working.

$$\frac{7}{12}\times\frac{9}{14} \text{ really means } \frac{7\times3\times3}{2\times2\times3\times2\times7}$$

$$\text{Cancelling} \quad \frac{\not{7}\times3\times\not{3}}{2\times2\times\not{3}\times2\times\not{7}}$$

$$= \frac{3}{8}$$

It is not necessary to express the numbers in factors in ordinary working. Cancelling is done by the highest common factor which is apparent on inspection.

Multiplication of mixed numbers can also be shown by the drawing of lines or rectangles:

$1\frac{1}{3}\times 1\frac{1}{4}$ = *one times* $1\frac{1}{3}+\frac{1}{4}$ *times* $1\frac{1}{3}$

$1\frac{1}{3}\times 1\frac{1}{4}=1\frac{1}{3}+\frac{1}{4}$ of $1\frac{1}{3}$

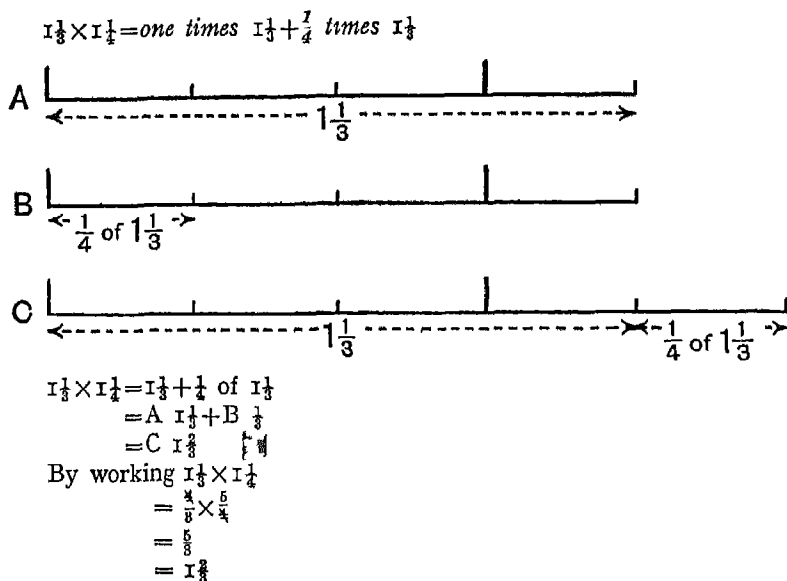
$=$A $1\frac{1}{3}+$B $\frac{1}{3}$

$=$C $1\frac{2}{3}$

By working $1\frac{1}{3}\times 1\frac{1}{4}$

$=\frac{4}{3}\times\frac{5}{4}$

$=\frac{5}{3}$

$=1\frac{2}{3}$

Again, once the rule is learned, dozens of examples must be given so that facility in working is obtained. The first examples should be simple, and gradually the difficulty may be increased. It is well to bear in mind that difficult fractions involving large numbers are unnecessary. Regular practice in cancelling helps to make children quicker in doing multiplication. Give frequent exercises such as the following. Simplify by cancelling:

1. $\frac{45\times 6\times 24\times 8}{4\times 9\times 36\times 25}$ **2.** $\frac{22\times 42\times 16\times 3}{7\times 48\times 6\times 33}$

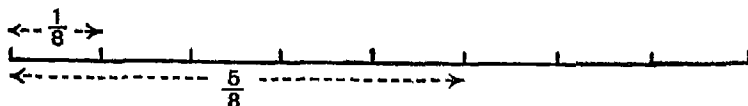
3. $\frac{60\times 60}{36\times 10\times 90}$ **4.** $\frac{15\times 45\times 65}{25\times 35\times 50}$

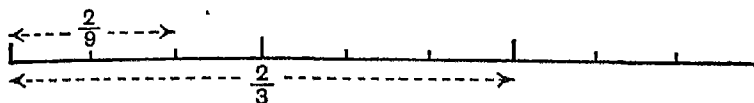
5. $\frac{4000}{2\times 8\times 75\times 9}$ **6.** $\frac{2\times 3\times 4\times 9}{720}$

Division of Fractions

It is advisable here, as in multiplication, to do some preliminary work with squared paper and the drawing of lines and areas to show fractions divided by whole numbers.

(*a*) The number of parts is actually divided.

Example. $\frac{5}{8}\div 5=\frac{1}{8}$

(*b*) The parts are made smaller by division.

Example. $\frac{2}{3} \div 3 = \frac{2}{9}$

Some easy oral exercises may then be given.

1. What fraction is found when 1 in. is divided by
   (*a*) 2; (*b*) 3; (*c*) 4, (*d*) 5, (*e*) 6?

2. What fraction of $\frac{3}{8}$ has to be found when it has to be divided by (*a*) 2, (*b*) 3, (*c*) 4?

The ruler may be used in working the following:

	(*a*)	(*b*)	(*c*)	(*d*)
3.	$\frac{2}{3}$ in. ÷ 2	$\frac{1}{4}$ in. ÷ 3	$\frac{4}{5}$ in ÷ 2	$\frac{7}{12}$ in. ÷ 7
4.	$1\frac{1}{3}$ in. ÷ 2	$1\frac{2}{5}$ in. ÷ 7	$2\frac{1}{4}$ in. ÷ 9	$2\frac{2}{5}$ in. ÷ 4
5.	$\frac{1}{2}$ in. ÷ 2	$\frac{1}{2}$ in. ÷ 4	$\frac{1}{2}$ in ÷ 5	$\frac{1}{2}$ in ÷ 6
6.	$1\frac{1}{2}$ in. ÷ 4	$1\frac{1}{3}$ in ÷ 3	$2\frac{1}{4}$ in. ÷ 5	$3\frac{1}{2}$ in. ÷ 6

Division of fractions by fractions is best approached through the idea of groups. One meaning of 15÷3 is "How many times can the group 3 be taken out of 15?" Exercises such as the following can then be given

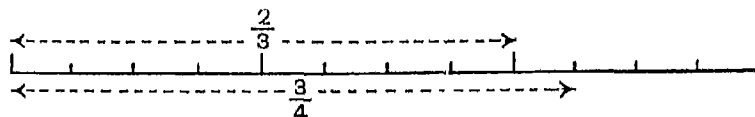
1. How many times is $\frac{3}{4}$d. contained in $3\frac{3}{4}$d.?
2. How many $\frac{1}{4}$ in are in $4\frac{1}{2}$ in.?
3. How many pencils each weighing $\frac{5}{8}$ oz. are in a bundle weighing 10 oz.?
4. How many pieces of tape $1\frac{1}{4}$ in. long together measure 5 in.?
5. How many $\frac{3}{4}$ lb packets of toffee can be made from $2\frac{1}{4}$ lb ?

Show that $\frac{5}{8} \div 3$ means $\frac{1}{3}$ of $\frac{5}{8}$, that is $\frac{5}{24}$. Prove the fact from the diagram, and then show the easiest way of finding that result

The short way of obtaining the result is:

$$\frac{5}{8} \div 3 = \frac{5}{8 \times 3} = \frac{5}{24}$$

Division of fractions by fractions may also be shown by the drawing of diagrams.

Example. $\frac{2}{3} \div \frac{3}{4} = \frac{8}{9}$.

Assume this to mean the number of times $\frac{3}{4}$ is contained in $\frac{2}{3}$. It is not contained a whole time. $\frac{2}{3}$ contains 8 of the 9 parts required to make $\frac{3}{4}$, that is $\frac{2}{3}$ contains $\frac{3}{4}$, $\frac{8}{9}$ of a time, or $\frac{2}{3} \div \frac{3}{4} = \frac{8}{9}$

Another way of considering division of fractions is this:

$12 \div 4$ may be regarded as the number by which 4 must be multiplied to give 12 as product. Similarly $\frac{12}{35} \div \frac{3}{5}$ means the number by which $\frac{3}{5}$ must be multiplied to give the product $\frac{12}{35}$

From the rule of multiplication the result must be $\frac{4}{7}$

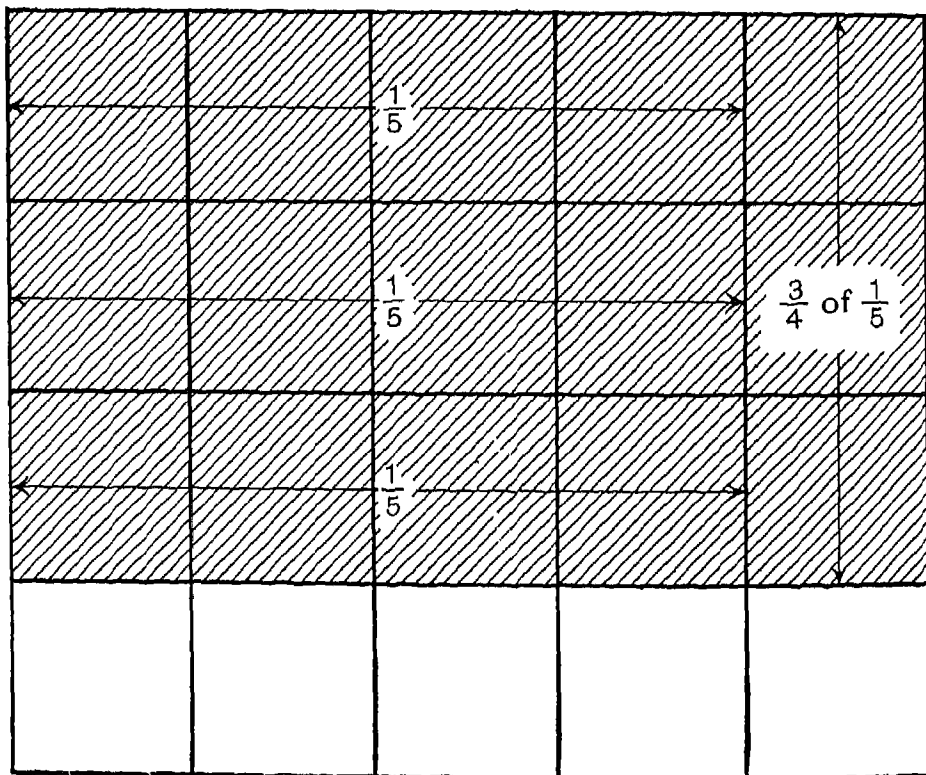
$$\text{i.e. } \frac{12}{35} \div \frac{3}{5} = \frac{12 \div 3}{35 \div 5} \text{ or, what is the same thing}$$
$$\frac{12 \times 5}{35 \times 3}$$

Hence the rule for division of fractions is to invert the divisor and multiply

$$\frac{2}{3} \div \frac{3}{4}$$
$$= \frac{2}{3} \times \frac{4}{3}$$
$$= \frac{8}{9}$$

The accompanying diagram shows that $\frac{3}{4} \div \frac{1}{5} = 3\frac{3}{4}$, or that $\frac{3}{4}$ contains $\frac{1}{5}$, $3\frac{3}{4}$ times

$\frac{1}{5}$ is represented by 4 small rectangles

$\frac{3}{4}$ is represented by 3 rows of rectangles.

Explanations are interesting to teachers, but it is wrong to try to explain too much to children, for explanations merely confuse the weaker ones. The reason for the rule will become clear to them later. There are, however, always some in a class who are not content with rules and want to know "why."

Remind children that when a number is multiplied by a proper fraction the product is less than the number multiplied, but when it is divided by a proper fraction the quotient is greater than the number divided

Once the rule has been demonstrated plenty of practice must be given in well-graded examples.

Probably children have done sums of the type in reduction exercises in weights and measures. Work the following to find how many times the amount below the line is contained in that above the line:

$$\frac{\text{£13 2s. 6d.}}{\text{7s 6d.}} \qquad \Big| \qquad \frac{\text{1 ton 2 cwt 2 qr.}}{\text{1 cwt. 2 qr.}} \qquad \Big| \qquad \frac{\text{73 weeks 2 days}}{\text{2 weeks 5 days}}$$

Now they can work examples expressing one quantity as the fraction of another

1. What fraction is 4 of 12? 4 oz. of 1 lb.? 1 pt. of 1 gal ?

2. Find the value of $\frac{\text{4d.}}{\text{1s}}$; $\frac{\text{1s 4d.}}{\text{2s. 6d.}}$; $\frac{\text{2 ft}}{\text{3yd.}}$; $\frac{\text{4 cwt.}}{\text{1 ton}}$

Decimals

Decimals are an easy and useful extension of the simple rules for whole numbers, and can be taught before, with or after vulgar fractions. They can be taught with very little reference to vulgar fractions. "It is important that he (the scholar) should be trained to think of quantities involving decimals without necessarily converting them into vulgar fractions."

"The first notions of decimal fractions may be obtained by making measurements in inches and tenths of an inch. No difficulty will attend the use of the decimal point in recording these measurements, the only explanation necessary at this period being that the first figure to the right of the decimal point means 'tenths' of whatever unit is used" *Handbook of Suggestions.*

The most direct way to introduce decimals is to let children have rulers with inches graduated in tenths, and to draw lines of various lengths. Some teachers prefer to begin by using the metric units, as 1 mm. can be seen to be a definite denomination, and 10 mm. are in 1 cm.; and 1 cm. is a definite denomination, and 10 cm. are in 1 dm.; and so on. One disadvantage of using this with children is that the centimetre and millimetre being so small require more careful manipulation, and give closer work for the eyes.

Simple first exercises can be given requiring children to draw lines of various lengths,—1 inch and 8 tenths long; 4 tenths of an inch; 1 inch and 5 tenths; 2 inches and 3 tenths—and so on. They can then be shown the way to write these measurements: 1·8, ·4; 1·5; 2·3.

A useful exercise to follow this is provided by giving each child a sheet of paper on which the teacher has cyclostyled a series of lines which are to be measured. These measurements are to be written by using the decimal point to separate the whole inches from the tenths.

Notation exercises will have led children to see that every figure has two values

1. Its value when standing alone,—i.e its number value, 3 means 3 units
2. Its value in relation to other figures,—i.e its place value. In 36, 3 means 3 *tens* of units.

In the number 237, 2 means 2 hundreds
3 means 3 tens
7 means 7 units.

In the number 3,333 3 means 3 thousands
3 means 3 hundreds
3 means 3 tens
3 means 3 units.

That is, each figure in the number 3333 has a value ten times less than the figure on its left. If we wished to write lower denominations we could proceed $3333\frac{3}{10}, \frac{3}{100}, \frac{3}{1000}$

In order to avoid using such fractions we write the decimal point.

Plenty of oral work should be given so that children understand that if a figure is moved one place to the *left*, its value becomes 10 times as great, and that if a figure is moved one place to the *right* its value is divided by 10; if moved two places to the *left* its value is increased 100 times; if moved two places to the *right* its value is divided by 100,—and so on.

A good way to make this clear is to draw a thick line down the middle of the blackboard, and tell the children that the line represents the decimal point; it is the dividing line between whole numbers and fractions

H.	T.	U	tenths	hun'hs
		6	5	
	6	5		
			6	5
		7	2	2
	7	2	2	
7	2	2		
1	6	9		
	1	6	9	
		1	6	9

Write on the board 6·5 Let a child read it aloud. Now write the same figures moving their position one place to the left Have this read aloud Write the figures with their positions moved one place to the right. Let the children tell the value of each figure in the three lines

6 units 5 tenths
6 tens 5 units
6 tenths 5 hundredths.

Many examples of this kind can be given until place value is understood.
Then give some exercises for children to write in their books or on slips of paper

1. Write as decimals 1 tenth, 4 tenths, 7 tenths;

   13 hundredths, 27 hundredths, 59 hundredths;
   3 hundredths, 7 hundredths; 9 hundredths.

2. Write these numbers in a column, putting tenths under tenths, units under units, tens under tens, etc. Make the last figure tenths by putting the decimal point in its right place. 3652, 279, 85; 9

3. Write these numbers in a column. Make the last figure hundredths by putting the decimal point in its right place: 7963; 587; 64; 3.
4. How many tenths are in 1·8, ·7; 3, 2·2; 4·7, 6·5?
5. How many hundredths are in 2; 1·6, 2·5, 3·25; 5·75?
6. Multiply each of the following numbers by 10: 17, ·8; 7·5; 9·6; 27·8, 67·5; ·28, ·59; ·01; ·07; 7·23; 82·37.
7. Multiply each of the following numbers by 100: 6; ·5, 7·8; 8·9; 52·6; 77·4; ·45; ·05; ·08; 6·27; 5·06; 72·58.
8. Divide each of the following numbers by 10: 650; 75; 6; ·5; 2·2; 18·1.
9. Divide each of the following numbers by 100· 7600; 9480; 1276; 352; 88; 7.

Addition and subtraction can first be done by cutting paper strips and using them as follows·

Each child should have 4 pieces of coloured paper 5 inches square. Take one piece, and mark off one side of it in ½ inches Then draw lines *dividing* the square into ten strips, each ½ in. wide. Cut the first piece which should consist of 5 strips, the next of two strips, the next of two strips, and the last of one strip. With these pieces, ·5, ·2, ·2, and ·1, it is possible to show any number of tenths, up to ten tenths. Have a second square cut into pieces in the same way and let the children write the values on all the pieces of both squares. Rule the remaining squares into strips but do not cut out the strips.

Give some practice in addition. Take 1 whole square and ·5 of a square; add to it ·4 of a square. By placing ·5 and ·4 side by side on one of the uncut squares, it is clear that ·5+·4=·9.

By using the strips add:

·5 and ·7	1·4 and ·7
·6 and ·3	1·6 and 1·7
·8 and ·4	1·3 and 1·9
·9 and ·5	1·8 and 1·6
·7 and ·9	2·5 and ·7
1·5 and ·6	·8 and 2·9

The ruler can again be used and more additions can be done by using the edge to draw lines and to measure them.

2·5 in.+1·3 in.; 3·4 in.+2·7 in.; 4·8 in.+3·9 in.

Children soon grasp the fact that addition of decimals is a simple extension of ordinary addition. They may then be given examples to work without the aid of a ruler or strips of paper. These should show a gradual increase in difficulty. The teacher should make the child realise the necessity for the careful setting out of sums. The points must be kept under points, tenths under tenths, hundredths under hundredths, just as in addition of money, pence are written under pence, shillings under shillings, etc. When place value is understood and addition can be worked, subtraction can be done, for there is no new difficulty to overcome. The first work should be oral and should be of a simple type.

1. From 1 take ·2; ·3; ·6; ·7, ·8; ·4.
2. What must be added to the following to make 1· ·25; ·75; ·55; ·35, ·15; ·95?
3. When ·2 of an hour has passed what decimal part remains?

4. A man spent ·6 of his money What decimal fraction remained? Give easy written examples:

5. 1·9—·7; 1·5—·8; 2—1·4, 2·5—1·6.
6. 3·4—1·7; 6·2—5·3, ·65— 38, 1 45—1·38
7. 7·6—3·25, 12·4—7·32, 25·45—9·8; 33·03—·28.

A little difficulty will perhaps occur in examples such as 7·6—2 45, where there are hundredths to be subtracted from tenths. Many teachers at first allow a prop to be used in examples of this kind. The child is allowed to make the number of places equal by adding a nought, thus the sum becomes 7·60—2·45; 2·7—1·37 becomes 2·70—1·37. As a rule this prop can very soon be dispensed with. The child imagines the noughts almost as easily as he writes them. When examples of this kind have been mastered the teacher can proceed to increase the difficulty of the work to any extent desired.

Multiplication of Decimals

Multiplication by an integer seldom presents any difficulty.

·5×3, or 3 times 5 tenths, is 15 tenths or 1·5.
2·5×3, or 3 times 5 tenths, and 3 times 2 is 1·5+6 or 7·5.

Many examples of this kind can be worked orally before written work is attempted. The first written work must be easy:

1. 1·8 ×7, 8, 9
2. 3·9 ×6, 9, 11.
3. 3·45×5, 7, 12.
4. 7·85×8, 11, 12—and so on.

The teacher has a choice of methods for teaching multiplication of decimals by decimals. I. The traditional method, which is still recommended by several modern writers on arithmetic, is "multiply as in simple multiplication and mark off in the product as many decimal places as there are in the multiplier and multiplicand together." If this method is to be taught some preliminary blackboard work should be done.

A. ·9×·7

$=\frac{9}{10}\times\frac{7}{10}$

$=\frac{63}{100}$

=·63

B ·03×·9

$=\frac{3}{100}\times\frac{9}{10}$

$=\frac{27}{1000}$

=·027.

These examples serve to show that by following the rule given above, the correct answer is obtained.

Some oral work may then be given

How many decimal places should be in the answers to the following:

·6×·8; ·07×1·3; ·112×2·7; 26·7× 09, ·0082×7; 6·86×2·72?

This method is very easy to teach, it is easy for the child to remember, and it is mechanically safe. The great objection to it is that it is cumbersome and lengthy; it can never be shortened. Also the value of each partial product is hidden until the final counting of places. It can be made a common-sense method if children are required to give approximate answers before working. Thus in the example 12·12×6·45 the answer must lie between 12×6 (72), and 13×7 (91). The answer must therefore be 78·174, and not 7·8174 or 781.74.

II. Another method of teaching multiplication of decimals by decimals, and one which is very popular at present, is that of reducing the multiplier to "standard form" before proceeding with the multiplication. This method is based on the fact that if one of two factors is multiplied by any number, and the other factor is divided by the same number, the product is unaltered. Thus 50×60=5×600=500×6=3000. Similarly 15 4× 053= 154×5·3, for the multiplier ·053 has been multiplied by 100, and the multiplicand 15·4 has been divided by 100.

Again 57·28×62=572 8×6.2, for the multiplier 62 has been divided by 10, and the multiplicand 57·28 has been multiplied by 10.

It should be noted that in each of these last two examples the multiplier has been changed to a number of a certain form,—namely one in which the point follows the left-hand figure. The multiplier is then said to be in "standard form".

Example. ·24×·52=·024×5·2

```
 ·024
5·2
------
 ·120
 ·0048
------
 ·1248
```

Having expressed the multiplier ·52 in standard form 5·2, and divided the multiplicand to correspond, set down the sum with the decimal points one below the other. Multiply by the 5, and write the figures of the product under the corresponding figures of the multiplicand and the point under the point. In each successive partial product the right-hand figure is written one place to the right, as in the multiplication of whole numbers.

Another example is given below. 34·57×·00782=·03457×7·82

```
 ·03457
7·82
---------
 ·24199
  027656
  0006914
---------
 ·2703374
```

In all partial products after the first, the point and added ciphers may be omitted, and the sum written as below.

```
 ·03457
7·82
-------
 ·24199
   27656
     6914
-------
 ·2703374
```

It is well to let the children have practice in expressing in standard form before requiring them to work examples.

In the following examples find by what number one factor has been multiplied or divided, and then alter the other factor accordingly:

1. ·36 × ·52 = ? × 5·2
2. ·47 × ·083 = ? × 8·3
3. 69 × ·37 = ? × 3·7
4. ·78 × ·54 = ? × 5·4
5. ·095 × ·036 = ? × 3·6
6. 62·7 × 160 = ? × 1·6

It is asserted by many teachers that this method of multiplication is reasonable and mechanically safe. It can at times lead to awkwardness, as in the following case: ·000273 × ·000059 = ·00000000273 × 5·9. Also children are apt to forget that it is possible to change the multiplier. E g. 6·7 × ·58 should be worked as ·58 × 6·7, and should not be standardised as ·67 × 5·8. This is quite unnecessary, one of the factors already being in standard form.

III A third method of teaching multiplication of decimals by decimals depends upon the fact that multiplication by the units digit does not alter relative place values. This can be illustrated by the use of columns such as were used before to show place value.

	H	T	U	t.	h	th.	tth
a			2	5	8		
b		2	5	8			
c				2	5	8	
d				0	2	5	8

The thick black line shows the position of the decimal point.

(*a*) 1·29 × 2
(*b*) 1·29 × 20
(*c*) 1·29 × ·2
(*d*) 1·29 × ·02

Many similar examples can be worked:

Multiply by 3; 30; ·3; ·03, ·003.
Multiply by 4; 40; 400; ·4; ·04.
Multiply by 5; 500; ·5; ·05, ·005

By this means children understand that multiplication by the units digit does not alter place values.

Once this fact is realised there is no difficulty in putting partial products in their correct positions with regard to the decimal point. A method of arrangement which simplifies the work for children is to write the units digit of the multiplier immediately beneath the last figure on the right of the multiplicand.

```
(a)  14·23×2·5          (b)  27·126×·183
     14·23                   27·126
        2·5                      0.183
     -------                 ---------
     28·46                    2·7126
      7·115                   2·17008
     -------                   ·081378
     35·575                  ---------
                              4·964058
```

The advantages of this method are obvious. The decimal point remains fixed, each partial product has its true value, and the answer is obtained without recourse to any mechanical trick. The method is easy to teach, leads to mechanical accuracy, and can be used for any example.

```
Thus 35 07×29·5 would be arranged  |  289·6×·0057 would be arranged
        35·07                      |     289·6
           29·5                    |        0·0057
     -------                       |    ---------
```

Children should be taught to check their work, and to understand that the worst mistake that can be made in any decimal calculation is to misplace the point. If the habit is formed of making a rough estimate of the answer before working, this mistake is not likely to occur.

Division of Decimals

In division of decimals by integers, the ordinary methods of short division, factor division, and long division are followed, and the only care needed is in placing the decimal point correctly in the quotient.

```
I.   6·72÷6
     6)6·72        or       1·12
     ------               ------
      1·12               6)6·72
```

II. 10·08÷16

4)10·08÷16
4) 2·52
·63

III. 5·51÷19

```
     ·29
   ----
19)5·51
   38
   --
   171
   171
   ---
```

With multiplication and division it is very helpful to use a zero for the units digit where necessary in the case of the multiplier or quotient, i.e. 0·473 instead of merely ·473. The Scottish Education Department recommends the general use of the units digit 0 for all decimal fractions lying between 0 and 1.

Division of decimals by decimals is harder to teach, though there are several methods in common use which give mechanical accuracy

I. One method is that of making the divisor a whole number, and then adjusting the dividend. The method is based on the fact that if the numerator and denominator of a fraction are each multiplied by the same number the value of the fraction is unaltered. Applied to division this means that if the divisor and dividend are each multiplied by the same number the value of the quotient is unaltered:

$$\frac{5{\cdot}185}{{\cdot}34} = \frac{5{\cdot}185 \times 100}{{\cdot}34 \times 100} = \frac{518{\cdot}5}{34}$$

When the divisor has been replaced by a whole number, and the dividend multiplied by the appropriate number, division proceeds in the ordinary way·

```
     15·25
    -----
34)518·5
   34
   --
   178
   170
   ---
     85
     68
     --
     170
     170
     ---
```

This method has the advantage of being easy to teach, and easy to explain 5·185÷·34 is really 518 hundredths ·5. divided by 34 hundredths. The decimal point is placed in the quotient without any difficulty, for it comes over the decimal point in the dividend. The disadvantage is that division by integers takes the place of decimal division, and the true remainder is not obtained at any stage in the sum. In an example such as follows children will have great difficulty in giving the true remainder·

How many coins each weighing ·56 oz can be made from 2½ lb. of metal, and what weight is left?

```
2½ lb =40 oz.  40÷·56=4000÷56
      71
   ------
56)4000
   392
   ---
    80
    56
   ---
    24          71 coins.
```

The remainder appears as 24, and the child is confused as to the actual value of this number. It is really 24 hundredths, that is ·24 oz.

Of course this difficulty can be overcome by careful explanation on the part of the teacher.

II. An older method of teaching division of decimals by decimals is that of equation of places. In the example 15·225÷2·9, we have three places in the dividend, and one in the divisor. Therefore we put three in each, thus making the number of places equal; then work the sum with whole numbers. When all the figures in the dividend have been used the decimal point is placed in the quotient:

```
15·225÷2·9
15·225÷2 900
 15225÷2900
          5·25
      --------
2900)15225
     14500
     -----
       7250
       5800
       ----
       14500
       14500
       -----
```

This is a simple method and quite easy to teach. There is no difficulty about the position of the decimal point in the quotient It has the same disadvantage with regard to the remainder as the method shown above. Also it frequently entails the use of unnecessary ciphers, and this increases the amount to be written

III. The "standard method" of division is akin to the "standard method" of multiplication. Before beginning the division the divisor must be expressed in standard form, that is with one units digit, and the dividend altered appropriately:

$$18{\cdot}45 \div {\cdot}018 \text{ becomes } 1845 \div 1{\cdot}8.$$

This again depends upon the application of the fundamental rule of fractions,—the value of a fraction is not altered if both numerator and denominator are multiplied by the same number or divided by the same number.

$$1{\cdot}0105 \div {\cdot}43 = 10{\cdot}105 \div 4{\cdot}3.$$

Care must be taken to place the first figure of the quotient correctly. This is best done by making a trial division 4·3 is only a little more than 4, and 10÷4 gives the first approximation of the quotient as 2 4·3 should be multiplied by 2 and the product placed under the dividend. The 2 should be written in the quotient over the dividend, the division then proceeding in the ordinary way.

A

```
        2·35
     --------
 4·3)10 105
       86
     ------
       150
       129
     ------
        215
        215
       ----
```

B. $\cdot638 \div 29 = \cdot0638 \div 2{\cdot}9$

A rough trial, ·06÷3 (2·9 is almost 3), gives ·02 as the first approximation of the quotient. These figures should be placed and the sum then worked in the ordinary way.

```
      ·022
 2·9)·0638
        58
     -----
         58
```

In teaching this method it is usual to begin with division by unit integers.

Find the following results:

$13{\cdot}2 \div 6$, $6{\cdot}72 \div 7$, $4{\cdot}2 \div 4$; $10{\cdot}08 \div 8$;
$51{\cdot}6 \div 8$; $405 \div 5$; $\cdot984 \div 3$.

The next step is to give division by divisors having one decimal place, a rough estimate of the quotient always being made before working

$546 \div 2{\cdot}1$, $416{\cdot}8 \div 1{\cdot}6$; $308{\cdot}7 \div 2{\cdot}8$.

Practice should then be given in expressing all divisors in standard form, and in altering the dividends accordingly. Many teachers assert that this method is simple and easily taught. It makes the division almost like division by a units digit, and so avoids any difficulty in placing the decimal point. It leads to a very simple contracted method. Beginners, however, as a rule find it more difficult. The *Handbook of Suggestions* contains a warning that when this method is used, or any other which requires the divisor and dividend to be transformed before working, the value of the new units in the dividend must be clearly understood if the value of the "remainder" is to be estimated truly.

IV. A method which is reasonable, easy to teach, and requiring no preliminary moving of the decimal point is given below.

It depends upon the fact that so long as "thousandths" are divided into quantities not less than "thousandths" there will be whole numbers in the quotient; so long as "hundredths" are divided into quantities not less than "hundredths" there will be whole numbers in the quotient, and so on.

5·185÷·34.

There are "hundredths" in the divisor so in the quotient there will be whole numbers, until the "hundredths" are used in the dividend. Before beginning to divide we can place the decimal point in the quotient.

(*a*) 5·185÷·34 = ·34)5·185

(*b*) 176·5 ÷·047 = ·047)176·500

(*c*) 12·897÷7·6 = 7·6)12·897

(*d*) 16·723÷ 129 = 129)16·723

Once the decimal point is placed, division proceeds in the ordinary way. The advantages of this method are obvious. No transforming of divisor or dividend is necessary It is a logical method, and the true value of the remainder can be seen at any stage The concrete example in method I. which required the actual remainder to be found, can be worked immediately by this method.

How many coins each weighing ·56 oz. can be made from 2½ lb. metal, and what weight is left?

```
2½ lb.=40 oz.  40÷·56
      71·
    ------
·56)40·00
    39·2
    ------
      ·80
      ·56
      ---
       24
```

Answer 71 coins; ·24 oz. left.

The *Handbook of Suggestions* has the following note on the connection between decimal and vulgar fractions:

"While the scholar should be able with facility to transform a decimal into a vulgar fraction and vice versa, and should be thoroughly familiar with the equivalence of such quantities as $\frac{3}{4}$, ·75, and 75 per cent., it is important that he should be trained to think of quantities involving decimals without necessarily converting them into vulgar fractions."

In the oral work which is done in preparation for decimals the connection between certain simple vulgar fractions and decimals should be learned. By cutting strips of paper such as were used in first learning addition of decimals, or by drawing on squared paper, such facts as $\cdot 5 = \frac{5}{10} = \frac{1}{2}$ may be demonstrated.

It is a good plan to let children make for themselves, and learn by heart, a table of equivalents. If this is done, much labour will be saved in later stages, and there will be speedier mental working.

$\frac{1}{2} = \cdot 5$	$\frac{1}{8} = \cdot 125$	$\frac{1}{5} = \cdot 2$
$\frac{1}{4} = \cdot 25$	$\frac{3}{8} = \cdot 375$	$\frac{2}{5} = \cdot 4$
$\frac{3}{4} = \cdot 75$	$\frac{5}{8} = \cdot 625$	$\frac{3}{5} = \cdot 6$
	$\frac{7}{8} = \cdot 875$	$\frac{4}{5} = \cdot 8$

The rule for converting a vulgar fraction into a decimal fraction should be known.

To express $\frac{3}{16}$ as a decimal is the same problem as to find the quotient $3 \div 16$ as a decimal

```
    ·1875
   ------
16)30
   16
   --
   140
   128
   ---
    120
    112
    ---
     80
     80
     --
```

Once this rule and the table of equivalents are known, there is no difficulty in doing decimalisation of money of a simple type. Some teachers advise that this should be taught at an early stage, and that long multiplication and division of money should not be taught until decimalisation of money is familiar, and that then they should be worked by that method. As we have not yet a decimal system of coinage in Great Britain most teachers will not want to follow this course.

Decimalisation of money is often useful in shortening the work in "finding the cost" sums. For the convenience of those who wish to do this work with children of eleven, the usual method is given below:

2s $= \frac{1}{10}$ of £1 = £·1.
1s. $= \frac{1}{2}$ of 2s $= \frac{1}{2}$ of £·1 = £·05.
6d. $= \frac{1}{2}$ of 1s. $= \frac{1}{2}$ of £·05 = £·025.
$\frac{1}{4}$d = £·001$\frac{1}{24}$

It is usual to write ¼d. as £·001, but as it is actually £·001$\frac{1}{24}$ a correction must be made when expressing a sum of money in pounds to 3 decimal places. In decimalising amounts up to 6d. we shall be reasonably correct if we reckon ¼d. as £·001, but add another £·001 when there are more than 11 farthings.

Although the rule for farthings is given here, it is not intended that it should be taught until a later stage. It is quite sufficient at first if children are able to decimalise even numbers of shillings, then odd numbers of shillings, then shillings and sixpences. Both money and other quantities can be decimalised by reduction methods if desired.

Express 18s. 3d. as a decimal of £1.

$$\frac{18\text{s. } 3\text{d}}{20\text{s.}} = \frac{18{\cdot}25}{20} = \begin{array}{l} 20)1{\cdot}825 \\ \quad\ \ {\cdot}9125 \end{array}$$

Express 7 fur. 5 chn. as a decimal of 1 mile.

$$\frac{7\text{ fur. } 5\text{ chn.}}{8\text{ fur.}} = \frac{7{\cdot}5}{8} = \begin{array}{l} 8)7{\cdot}5 \\ \quad {\cdot}9375 \end{array}$$

AREA

"Calculations as to lengths, areas and volumes have to be undertaken in every walk of life, and they also have bearing on the economy of the home. . . . The teaching of the rules and formulæ of mensuration ought to be founded on the children's practical work and on drawings and measurements made by them" *Handbook of Suggestions.*

Children must get a practical knowledge of the square inch and the square foot for themselves before any formal work is attempted. Each child may be allowed to cut out a square inch in stiff paper or cardboard, and then use this to discover how many square inches are in various small squares and rectangles which he has drawn on squared paper or in his practical arithmetic book (an exercise book ruled in squares). Suitable figures to draw for this measuring are squares of 2 in., 3 in and 4 in.; rectangles 3 in. long by 2 in. broad, 4 in. long by 2 in broad, 5 in. long by 2 in. broad, 4 in. long by 3 in. broad, etc.

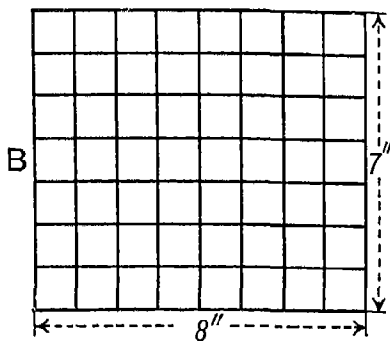
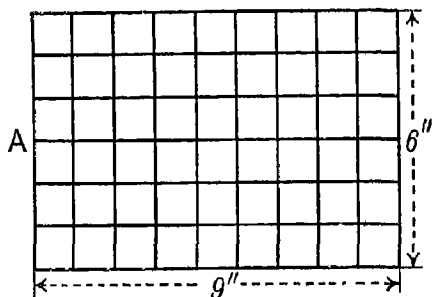
When the square inch is familiar the square foot must be investigated. Pieces exactly one foot square may be cut from large sheets of drawing paper, or from sheets of brown paper. One of these may be given to each child. With a ruler he marks off along the sides the separate inches. When this is done, lines are drawn across marking the square inches. Then by counting each scholar may discover that there are 144 sq. in. in 1 sq. ft.

Instead of giving each child a one-foot square of paper, the teacher may prefer to use a blackboard ruled in square inches and draw a square foot on it. The children discover from the diagram the number of square inches in a square foot.

Probably, while doing the first exercises with square inches, many children will find for themselves how to tell the number of square inches in a square or a rectangle without counting the number.

Now an exercise may be given which will make this method clearer.

Draw on the blackboard two rectangles, A, 9 in. by 6 in., and B, 8 in. by 7 in. Tell the children that they have to find which is the larger, A or B.

It is not easy to tell without actual measurement, for A is longer than B, and B is wider than A. Mark off the sides of each in inches, and draw lines across, cutting up the rectangles into square inches.

In A there are 9 squares in a row, and there are 6 rows. Therefore there are 9×6, or 54 square inches.

In B there are 8 squares in a row, and there are 7 rows. Therefore there are 8×7, or 56 square inches.

The area of A is 54 sq. in.; the area of B is 56 sq. in. B is therefore the greater.

This exercise could quite well be done by giving each child paper and letting him cut out the rectangles and mark them off into square inches. Then the following questions should be asked:

1. In A how many rows of squares are there?
2. How many squares are in each row?
3. How many squares are there altogether?
4. How did you get the last answer?

And so on with B.

The method of finding the number of square units in the area—multiplying the number of units in the length by the number of units in the breadth—is thus clearly shown. Further easy exercises may now be given.

The children should become familiar with the square foot in its various forms. They should realise that these oblongs—3 ft. by 4 in.; 4 ft. by 3 in.; 6 ft. by 2 in.; 2 ft. by 6 in.; 18 in. by 8 in.; 16 in. by 9 in.—each has an area of 1 sq. ft. On the squared blackboard the teacher should then draw rectangles of area ½ sq. ft. and ¼ sq. ft., and the children should learn how many square inches each contains. Many simple but interesting examples can now be worked. Various objects in the classroom and school can be measured and their areas discovered.

1. What is the area of 1 pane of glass in the window. There are 4 panes in each section of the window. What is the area of glass in a section? There are 9 sections in each window. What is the area of glass in a window? There are 3 windows in the room. What is the total area of glass in the 3 windows?

2. Measure the length and breadth of the teacher's table. What is its area?
3. Measure the length and breadth of a desk What is its area? How much greater is the area of the teacher's table?
4. Measure the height and breadth of the door. What is its area?
5. Measure the length and breadth of the school notice board Find its area. How many bills each 1 ft. long and ½ ft wide could be pinned on it?
6. Measure the length and breadth of 1 wooden block in the floor. Calculate the area covered by 6 blocks, 12 blocks, 20 blocks.

When the square inch and square foot are thoroughly familiar the square yard must be examined A yard square of cardboard is rather unwieldy for class use, but it is useful to have a square yard cut out in brown paper. Have lines drawn upon it dividing it into square feet, and have it pinned up on the classroom wall. The blackboard, the wall, or floor space in front of the class can be used for drawing a yard square. Children very easily perceive and memorise the fact that 9 sq. ft.=1 sq yd.

Finding the area of the classroom itself is a convenient exercise in the use of square yards. As a rule tape measures can easily be obtained in school, and these may be used to measure the length and breadth of the room. Should the room not be an exact number of yards in length and breadth, then, as it is a first exercise, rule off on the floor with a piece of chalk the extra part, and find the area without that part. Later, when the children are used to working multiplication of fractions, the exact area may be found. Also the area can usually be found in square feet, and this number reduced to square yards.

Here, however, we come to one of the "knotty" points in the teaching of areas. Teachers of older children frequently complain that far too much time has to be taken to get children out of the habits they have formed when young, of working areas by long multiplication and division They assert that only the simplest areas should be attempted until multiplication and division of fractions can be worked readily. One modern textbook tackles the difficulty by giving numerous examples of this type to be worked before area is attempted.

$$\frac{24\times30\times16}{144\times9} \qquad \frac{36\times27\times25}{9\times12\times15} \qquad \frac{105\times15\times20}{75\times25\times35}$$

When children are familiar with multiplying and dividing in this way, the finding of areas, and the working of other sums involving areas can be done in the shortest way.

Drawing to Scale

It is necessary that children should be able to draw plans and diagrams correctly to scale Simple scale drawing can be done in the junior classes in connection with handwork and the making of models. Later, it is very useful in the drawing of plans and diagrams in connection with area. At first, all that is needed is a ruler. Later, it is necessary for each child to have a set square and a compass. This work may be started by setting exercises in straight lines:

1. If 1 in. represents 1 mile, draw lines to represent 3 ml., 5 ml; 4½ ml.; 6¼ ml.
2. If ½ in. represents 1 mile, draw lines to represent 2 ml.; 3 ml.; 5 ml; 2½ ml
3. If ½ in represents 1 foot, draw lines to represent 4 ft; 7 ft, 4½ ft., 8½ ft.
4. If ¼ in represents 1 yard, draw lines to represent 4 yd., 6 yd; 7 yd, 9 yd.

Have lines of various lengths cyclostyled on sheets of paper. See that each line is lettered or numbered Give each child a sheet. Then set exercises such as the following:

1. What lengths do lines A, B and C represent, if 1 inch represents a mile?
2. What lengths do lines A, B and C represent, if $\frac{1}{4}$ inch represents a mile?
3. What lengths do lines D, E, F represent, if $\frac{1}{2}$ inch represents a yard?
4. What lengths do lines D, E, F represent, if $\frac{1}{4}$ inch represents a foot?
5. What lengths do lines G, H, I, represent, if $\frac{1}{8}$ inch represents a yard?
6. How much longer is length represented by C, than that represented by D; G, than A; E than I, if $\frac{1}{10}$ in. represents 1 foot?

Other and more interesting examples can be done if squared paper is used. This allows squares and rectangles to be drawn correctly without the use of set squares.

1. John started from A and walked 3 miles north. He turned and walked 4 miles east to B. Let 1 inch represent a mile, and draw a diagram showing his walk With your ruler find how far A is from B in a straight line.

2. Measure the length and breadth of your classroom. Choose a suitable scale, and draw a plan of it. When you have drawn a plan of the floor, measure various objects in the room, (door, fireplace, radiators, cupboard, table, etc.), and put them in your plan in their correct places.

Factors and Multiples

Extract from the *Report of the Consultative Committee on the Primary School*, 1931.

"If these types (fractions with denominators that are unlikely to be met with in life and complicated examples) are omitted there is no necessity to include 'greatest common measure' and 'least common multiple' in the primary school course, and we consider that they should be omitted."

Experienced teachers who know that it is possible for children to obtain a good working knowledge of simple fractions, without any reference to factors and multiples, will agree with the opinion expressed above. This work on factors and multiples is therefore included, not for general use, but solely for the use of those teachers who are giving lessons in arithmetic for special purposes.

It is usual to begin by explaining the terms even numbers, odd numbers, prime numbers, factors and multiples, and to give easy exercises on these.

1. Write (*a*) all the even numbers less than 20.
   (*b*) all the even numbers between 20 and 40.

2. From the following numbers write those which are even 14, 23, 48, 119, 26, 213.
3. $10=2\times 5$. 10 is a multiple of 2, and a multiple of 5. 2 and 5 are factors of 10. Write two other numbers which are multiples of 2, and two which are multiples of 5.
4. Write two factors of each of these numbers 9, 15, 16, 22, 25, 42.
5. A prime number has no factor but itself and 1, e.g. 2, 3, 7, 11, 13.

6. Draw a large square with all the numbers from 1 to 100, like this

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	34	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

7. Cross out all the multiples of 2, but not 2 itself.
8. Cross out all the multiples of 3, but not 3 itself.
9. Cross out all the multiples of 5, but not 5 itself.
10. Cross out all the multiples of 7, but not 7 itself.
Now the numbers which are left are prime numbers. Look carefully at each line and write them down.
11. Give the prime factors of each of the following: 14; 26; 30; 35; 40; 48.

Some explanation should be given of the meaning of Factor, Multiple, Common Factor, Common Multiple, H.C.F., and L.C.M., although *definitions* are not required.

The statement $15 = 3 \times 5$ infers any one of the following statements:

(*a*) 15 is the product of 3 and 5.
(*b*) 15 is a multiple of 3; and also a multiple of 5.
(*c*) 3 is a factor of 15; 5 is also a factor of 15.

Exercises in finding multiples of given numbers and factors of given numbers then follow:

4 has the following multiples: 8, 12, 16, 20, 24, 28, 32, 36, 40, etc.
6 has the following multiples: 12, 18, 24, 30, 36, 42, 48, etc.

Explain the word "common," as "belonging to more than one,"—as in Acts iv, v 32.—the usual meaning in mathematics.

4 and 6 have the *common* multiples 12, 24, 36, 48, etc.

Of these the smallest is the most important and is called the *Least* Common Multiple, or L.C.M.

In the same way, 36 has the following factors: 2, 3, 4, 6, 9, 12, 18.

60 has the factors 2, 3, 4, 5, 6, 10, 12, 15, 20, 30.

36 and 60 have thus the *common* factors 2, 3, 4, 6, 12.

Of these the largest, 12, is the most important. It is called the *Highest* Common Factor, or H.C.F.

1. Find the prime factors and then give those which are common to both numbers of the following pairs: (*a*) 18, 27; (*b*) 24, 28, (*c*) 48, 56; (*d*) 36, 60.

2. Find the prime factors and give the Highest Common Factor of each pair: (*a*) 12, 16; (*b*) 36, 42; (*c*) 35, 45; (*d*) 63, 54.

3. Find the Highest Common Factor in each of the following sets of numbers: (*a*) 12, 21, 27; (*b*) 16, 28, 32; (*c*) 25, 35, 40; (*d*) 27, 45, 63.

At this stage many useful exercises can be set from a table which children can make for themselves.

1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3	6	9	12	15	18	21	24	27	30	33	36
4	8	12	16	20	24	28	32	36	40	44	48
5	10	15	20	25	30	35	40	45	50	55	60
6	12	18	24	30	36	42	48	54	60	66	72
7	14	21	28	35	42	49	56	63	70	77	84
8	16	24	32	40	48	56	64	72	80	88	96
9	18	27	36	45	54	63	72	81	90	99	108
10	20	30	40	50	60	70	80	90	100	110	120
11	22	33	44	55	66	77	88	99	110	121	132
12	24	36	48	60	72	84	96	108	120	132	144

Table for Exercises on Factors

4. Give any two factors of each number in the 2nd, 3rd, and 4th line (both vertically and horizontally) of the table. Find the square of each number.

5. Write all the numbers of which 5 is a factor.

6. Write all the numbers in line 5 and line 8 which have 3 for a factor.
7. Write the prime factors of every number in line 9. Then give exercises in multiples.
8. Find all common multiples of 2 and 3 in the 2nd line of the number square.
9. Write all the multiples common to 3 and 4 which are less than 100.
10. Write all the multiples common to 4 and 5 which are less than 120
11. Find two common multiples of each of the following pairs: (*a*) 3, 5; (*b*) 4, 7; (*c*) 3, 8; (*d*) 5, 11
12. Find the least common multiple of (*a*) 6, 9, (*b*) 5, 7; (*c*) 9, 10; (*d*) 8, 12
13. What is the least common multiple of (*a*) 2, 3, 4; (*b*) 3, 4, 5; (*c*) 5, 7, 10, (*d*) 6, 8, 9?
14. What is the least common multiple of (*a*) 2, 3, 4, 5; (*b*) 2, 4, 6, 8; (*c*) 3, 6, 9, 12; (*d*) 3, 5, 10, 12?

To help children to split up numbers into prime factors rapidly, show a few simple tests of divisibility·

(*a*) Divisibility by 2 If 2 is a factor of a number, the units digit is even.
(*b*) Divisibility by 4. If 4 is a factor of a number, the number formed by the last two digits is divisible by 4.
(*c*) Divisibility by 5 and 10 is well known.
(*d*) Divisibility by 3 and 9 If 3 or 9 is a factor of a number the sum of its digits is divisible by 3 or 9.

Much of this knowledge will be acquired incidentally by the brighter children, and they should be encouraged to find extensions of these tests,—e.g. if a number is divisible by 2 and 3, it is also divisible by 6.

The explanation of these rules of divisibility is better left until the children are more advanced. Practice will soon enable them to recognise at sight simple multiples of 13, 17, 19, etc.

PROPORTION

In the *Report on the Primary School*, under the heading of *Problems*, the following reference is made to the teaching of Proportion

"They will include questions of the type usually grouped in the textbooks under the name of 'rule of three' which can be worked by the method of unity or a fractional method. . . . The formal teaching of ratio and proportion should be left to the later stage of education."

In this section are grouped problems concerning prices and quantities, distance and time, men and work, where one quantity varies either directly or inversely with another. The method of unity is popular probably because it can be taught easily, and is capable of simple explanation.

In the section dealing with division of money mental examples of this type were given.

1. 4 oranges cost 8d What was the cost of one?
2. 5 books cost 11s. 3d. What was the cost of one?

   Examples of this type really form the first approach to the method of unity. Children can then be allowed to experiment for themselves with the following type·
3. 7 balls cost 8s. 9d. What was the cost of 3 balls?

4. 8 hens cost £1 10s. What was the cost of 5 hens?
   They will probably discover the unitary method for themselves, and may then be shown the usual way of setting out such examples.

Example. 12 bottles of lemonade cost 18s. What was the cost of 7 bottles?

Since 12 bottles cost 18s

$\therefore$ 1 bottle costs $\frac{18s}{12}$=1s. 6d

$\therefore$ 7 bottles cost 1s 6d.×7=10s 6d.

The middle step, reduction to the unit, can be omitted so soon as children are familiar with the method The division and multiplication can be worked in the last line.

Example: 5 acres of land cost £240. At the same rate what should be paid for 16 acres?

5 acres cost £240

$\therefore$ 1 acre costs $\frac{£240}{5}$

Cost of 16 acres$=\frac{£240}{5}\times 16$

$=£48 \times 16$

$=£768$

One defect of this method is that it is cumbersome, and a second is that it leads to the making of unintelligent statements; e.g £25 7s 6d was paid in wages to 7 men. At the same rate how many men could be paid wages from £54 7s. 6d.?

£25 7s. 6d. was paid to 7 men

$\therefore$ £1 was paid to $\frac{7}{25\frac{3}{8}}$ men,

—which is absurd in the sense that it deals with a fraction of a man.

The method of unity can be made to lead to the fractional method, which is becoming more and more popular in schools, because it is logical and terse. Examples such as the following may be given:

1. 8 frames cost £1 16s. What was the cost of 4 frames?
2. 9 lb. of tea cost 15s. What was the cost of 27 lb of tea?
   Here children will discover that it is not necessary to reduce to the unit at all, because of the relationship (ratio) between (in No 1) 8 frames and 4 frames, and (in No. 2) between 9 lb. and 27 lb.
   The difficulty in this method comes when the idea has to be extended to numbers that are not simple multiples or submultiples. If carefully graded examples are given this difficulty can be overcome.

3. 5 tops cost 1s. 5½d Find the cost of (*a*) 15 tops (*b*) 17 tops. 15 tops will cost 3 times as much as 5 tops because 5 is contained in 15 three times—1s. 5½d ×3=4s. 4½d.

The cost of 17 tops contains the cost of 5 tops as many times as 17 contains 5, —i.e. $\frac{17}{5}$ times.

Cost of 17 tops=1s. 5½d×$\frac{17}{5}$
=4s. 11½d.

4. 28 knives cost £1 3s. 4d What was the cost of (*a*) 7 knives? (*b*) 11 knives?

7 knives will cost ¼ of £1 3s 4d. because 7 is ¼ of 28.
7 knives cost ¼ of £1 3s. 4d.
i.e. 5s. 10d.

11 knives will cost the fraction of £1 3s 4d. that 11 is of 28—i.e. $\frac{11}{28}$

Cost of 11 knives=$\frac{11}{28}$ of £1 3s. 4d.

$=£\frac{7}{6}\times\frac{11}{28}$ (28 cancelled to 4)

$=£\frac{11}{24}$

=9s. 2d.

The following has been found a successful way of teaching children to reason out these examples. They should be taught to ask themselves three questions as they work a sum.

1st question.—What is my answer to be, money or time or men or weight, etc.? Having answered this question, they should then write down at the end of a line in their exercise books the figures expressing the money or time or men or weight, etc given in the example.

Example: 600 bunches of reeds weigh 2 tons 10 cwt Find the weight of 2100 bunches.

Ask the first question.
The answer is to be weight
Write down 2 tons 10 cwt. (2½ tons) at the end of the line—2½ tons.
Complete the statement concerning 2½ tons.
600 bunches weigh 2½ tons.
Then comes the second piece of reasoning.

2nd question—Is my answer to be more or less?
The answer is to be more.

3rd question—What fraction of the given weight is the answer to be?

The answer is to be $\frac{2100}{600}$ of 2½ tons

Children should notice that the fraction is made by comparing the two numbers of "bunches". The statement will now read:

600 bunches weigh $2\frac{1}{2}$ tons.

2100 bunches weigh $\frac{2100}{600}$ of $2\frac{1}{2}$ tons.

$$=\frac{\overset{7}{\cancel{2100}}}{\underset{2}{\cancel{600}}}\times\frac{5}{2} \text{ tons}$$

$$=\frac{35}{4} \text{ tons.}$$

$$=8\tfrac{3}{4} \text{ tons.}$$

Although the word ratio is not mentioned in this method, it is clear that the fraction which is made from the two numbers 2100 and 600 is the ratio of 2100 to 600 expressed as a fraction.

Two further examples are given:

1. If 2000 oranges cost £6 5s. what should be paid for 240 oranges?

When the three questions have been asked we obtain the following answers:

First—The answer is to be money.

Second.—The answer is to be less than £6 5s.

Third—The answer is to be $\frac{240}{2000}$ of £6 5s, or £6 5s. $\times\frac{240}{2000}$

$$£\frac{\cancel{25}}{4}\times\frac{\overset{3}{\cancel{240}}}{\cancel{2000}}=£\frac{3}{4}=15\text{s.}$$

2. If a train travels 44 miles in 55 minutes how long will it take to go 80 miles?

First—The answer is to be time.

Second.—The answer is to be more than 55 minutes.

Third—The answer is to be $\frac{80}{44}$ of 55 minutes.

i.e. $\frac{\overset{20}{\cancel{80}}}{\underset{4}{\cancel{44}}}\times\overset{5}{\cancel{55}}$ minutes

or 100 minutes.

SCHOLARSHIP EXAMINATION PAPERS

THE following examination papers in arithmetic have been reprinted by kind permission of various educational authorities. It has been possible to include only a few of the many papers placed at our disposal, but those selected contain typical examples of the work expected from children of eleven years of age.

BUCKS COUNTY EDUCATION COMMITTEE

(Entrance Scholarships Examination)

PART I.

1. Find the value of $690 \times 57 \div 38$.
2. Multiply £59 18s $9\frac{3}{4}$d. by 75.
3. A piece of calico is 4 yds 2 ft 7 in long Another piece is $\frac{5}{7}$ of the length of the first piece What is the total length, in yards, of the two pieces?
4. The cost of 6·75 tons of coal is 15 guineas How much are 12 cwts of this coal worth?
5. Make out a bill for —

   3 lb of lard at $8\frac{1}{2}$d. per lb., $2\frac{1}{4}$ lb. of cheese at 1s 3d per lb ; $\frac{3}{4}$ lb. of bacon at 1s 7d. per lb ; 10 oz. of suet at 1s. per lb , 20 eggs at 2s. 3d. per doz.

PART II.

6. A van contains 168 parcels, each weighing 2·85 lb Find, in cwts. and a decimal of a cwt., the weight of all the parcels.
7. What is the value, at $6\frac{1}{2}$d per quart, of the milk obtained from 12 cows in 26 weeks, reckoning that each cow gives 3 gallons of milk per day?
8. A piece of cloth is 15·25 yd long. From it are cut 6 pieces each 2·375 ft. long. How many pieces each 0·5 yard long can be obtained from the remainder?
9. The product of three numbers is $29\frac{7}{10}$. One of them is $2\frac{3}{4}$; another is $3\frac{1}{5}$. Find the third number.
10. Find, in the shortest way you know, how much more 56 books at 3s. 6d. each will cost than 57 books at 3s. 4d. each.
11. An oblong floor 17 ft 6 in. long and 13 ft 6 in wide is made by means of boards that are 5 inches wide. What length, in yards, of boarding will be required?
12. A greengrocer sold $\frac{3}{5}$ of his cauliflowers at 6d. each For the rest, at 8d. each, he received £1 12s How much did he receive for all the cauliflowers?
13. A room is 17 ft 9 in long, 15 ft. 6 in. wide, and 10 ft high How much will it cost, at 2s 9d. per square yard, to colour both long walls and one short wall?

Mental Arithmetic

1. 7295+684+378+96+2567.
2. £32 12s. 3¼d.—£15 16s. 7½d
3. Express 57 ounces in pounds and ounces
4. How many hats at 6s 8d. each are worth £57 13s. 4d?
5. Cost of 43 articles at 3s. 6d per doz.
6. How many times is $\frac{1}{1000}$ contained in 8·4?
7. Divide $\frac{1}{2}+\frac{3}{4}$ by $\frac{5}{16}$.
8. If $\frac{3}{5}$ of my money is 7s. 6d., how much is $\frac{7}{10}$ of it?
9. Value in yards of 0·4 mile
10. What decimal fraction of a square yard is the area of an oblong 1·2 ft. by 4·5 ft.?

CHESHIRE EDUCATION COMMITTEE

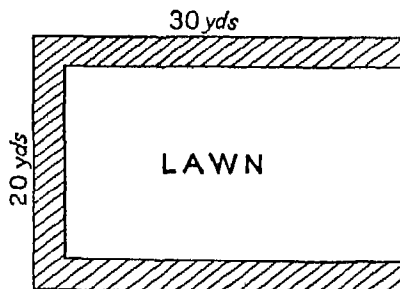
(County Free Places Examination.)

A.

1. From £100 take 13 times £6 17s. 8½d
2. Find the cost of 117 tons at £2 5s. 6d per ton.
3. Three-fifths of a sum of money is £21 12s. What is the sum of money?
4. From £4·175 take £2 13s. 6d., and give your answer in decimal form.

B.

1. A woman bought 4½ lb of bacon at 1s. 10d. per lb., and some cheese at 1s 8d per lb. If the cheese cost 11d more than the bacon, what weight of cheese did she buy?
2. A motorist found that he could travel 24 miles on a gallon of petrol costing 1s 6d. What would be the cost of a journey of 500 miles at this rate?
3. A candle which is 7·5 inches long burns at the rate of 1·2 inches per hour. If it is lit at 6 p m., at what time will it be all burnt?
4. The figure represents a garden consisting of a lawn surrounded on three sides by a path everywhere 6 feet wide Find—

   (i) the area of the lawn;
   (ii) the total area of the path.

Mental Arithmetic

1. Add together 239, 27, and 109.
2. From £1 take 14s $7\frac{1}{2}$d.
3. Give the cost of 3 dozen things at $3\frac{1}{2}$d. each.
4. Give the difference between 1,000 yards and half a mile.
5. How many hours and minutes are there from 11 30 a m to 2 15 p.m ?
6. A motorist travelled 60 miles in $1\frac{1}{2}$ hours How many miles was this per hour?
7. If eggs were 15 for 2s., what would 5 cost?
8. In 1930 a boy was 12 In what year was he born?
9. If a map scale was 1 in. to 100 miles, what distance was represented by $2\frac{1}{4}$ inches?
10. The difference between $\frac{1}{2}$ and $\frac{1}{4}$ of a sum of money was 1s 6d. What was the sum?
11. Divide 2s between 2 girls so that one has twice as much as the other.
12. How many shillings are there in £2·25?
13. What is the distance round a room 12 ft. long and 10 ft 6 in. wide?
14. When boys in a line were counted the middle boy in the line was No 13. How many boys were there?
15. How many squares of half-inch side can be drawn on a piece of paper 4 inches long and 3 inches wide?
16. From 10 yards of cloth, 6 pieces each of 1·25 yards are cut. What length is left?
17. How many packets of tea, $\frac{3}{4}$ lb. each, can be made from 6 lb.?
18. In an arithmetic exercise a boy worked Nos 1, 3, 5, and so on. How many did he work out of 21 sums?
19. The distance round a square is 1 ft. 8 in. What is the area of the square?
20. If 3 pennies weigh 1 ounce, what is the value of 1 lb weight of pennies?

EDINBURGH CORPORATION EDUCATION COMMITTEE

(Qualifying Examination—A.)

1. Copy down and add—

£	s	d.
357	18	$5\frac{3}{4}$
1086	15	$10\frac{1}{2}$
978	10	$9\frac{3}{4}$
29	6	$8\frac{1}{2}$
796	17	$11\frac{1}{4}$

2. Find the total cost of—

$15\frac{1}{2}$ lbs at 6d per lb.
17 lbs. at $5\frac{1}{2}$d per lb
$14\frac{1}{2}$ lbs. at 3d. per lb.
$6\frac{1}{4}$ lbs at 1s 6d per lb

3. Find the value of—

$\frac{3}{5}+(\frac{8}{9} \text{ of } \frac{27}{32})-\frac{17}{18}$.

4. Multiply 1·995 by 5·7 and divide the result by ·35.
5. How many $\frac{1}{2}$-lb. packets of tea can I fill out of 4·375 cwts ?
6. A man bought 6 dozen articles at 8$\frac{3}{4}$d. each, but only managed to sell 50 of them at 11$\frac{1}{2}$d. each Did he gain or lose; and how much did he gain or lose?
7. If 16 gallons cost £3 12s, what will 120 pints cost?
8. A man works 7 hours 30 mins. on Monday,
   9 hours 15 mins. on Tuesday,
   8 hours 40 mins. on Wednesday.

   Find how many minutes are left out of the whole week

(Qualifying Examination—B.)

1. Copy down and add—

£	s	d.
471	12	6$\frac{1}{2}$
1157	18	3$\frac{3}{4}$
896	10	9$\frac{1}{2}$
35	7	10$\frac{3}{4}$
921	14	7$\frac{1}{4}$

2. Find the total cost of—

   17$\frac{1}{2}$ lbs. at 6d. per lb.
   15 lbs. at 5$\frac{1}{2}$d. per lb
   16$\frac{1}{2}$ lbs. at 3d per lb.
   4$\frac{1}{4}$ lbs at 1s. 6d. per lb.

3. Find the value of—

   $\frac{5}{8}+(\frac{7}{8} \text{ of } \frac{16}{21})-\frac{19}{20}$.

4. Multiply 2·275 by 6·5 and divide the result by ·35.
5. How many $\frac{1}{2}$-lb. packets of tea can I fill out of 3·875 cwts.?
6. A man bought 6 dozen articles at 9$\frac{1}{2}$d each, but only managed to sell 50 of them at 11$\frac{1}{2}$d. each. Did he gain or lose; and how much did he gain or lose?
7. If 16 gallons cost £3 12s., what will 160 pints cost?
8. A man works 8 hours 50 minutes on Monday,
   7 hours 45 minutes on Tuesday.
   9 hours 30 minutes on Wednesday.

   Find how many minutes are left out of the whole week.

(Additional Questions for Bursary Applicants.)

9. A newsboy is charged 9d per dozen for newspapers, but is given 13 to the dozen. If he buys six dozen, and sells them all at a penny each, what profit does he make?
10. A motor cyclist set out at 8 a.m. on a journey of 260 miles. He travelled at the rate of 25 miles an hour until 12 noon when he stopped and had lunch He set off again at 1 p m, and had travelled 50 miles more at his former speed, when he had a puncture. He was delayed for 50 minutes. At how many miles per hour must he travel to reach his destination at 7.30 p.m. ?

Mental Arithmetic

(Qualifying Examination—A)

1. Add together $9/6\frac{1}{2}$, $4/7\frac{3}{4}$, and $10/11\frac{1}{2}$.
2. How many cwts. in—
   $\frac{5}{12}$ of 1 ton 4 cwts ?
3. $\cdot 375 \div \cdot 05$
4. $\frac{1}{3}+\frac{1}{4}+\frac{1}{5}$
5. Write as one decimal fraction—
   $\frac{2}{10}+\frac{8}{1000}$
6. How many inches in ·75 of a yard + ·25 of a foot?
7. How many half-pints in 3 gallons?
8. If you can buy 3 articles for 1/-, how many can you buy for 3/8?
9. If you bought a gallon of milk for 4/- and you spilt $\frac{1}{2}$ pint of it, what was the value of the milk you lost?
10. If your school work begins at 9 a m , and you have ten minutes off for play, how many minutes do you work if you dismiss at 12 noon?

(Qualifying Examination—B.)

1. Add together $8/7\frac{1}{4}$, $5/9\frac{1}{2}$, and $10/8\frac{1}{4}$
2. How many cwts. in—
   $\frac{5}{11}$ of 1 ton 2 cwts ?
3. $\cdot 275 \div \cdot 05$
4. $\frac{1}{4}+\frac{1}{6}+\frac{1}{8}$
5. Write as one decimal fraction—
   $\frac{3}{10}+\frac{2}{1000}$
6. How many inches in ·25 of a yard + 75 of a foot?
7. How many half-pints in 2 gallons?
8. If you can buy 3 articles for 1/, how many can you buy for 3/4?
9. If you bought a gallon of milk for 6/- and you spilt $\frac{1}{2}$ pint of it, what was the value of the milk you lost?
10. If your school work begins at 9 a m , and you have 15 minutes off for play, how many minutes do you work if you dismiss at 12 noon?

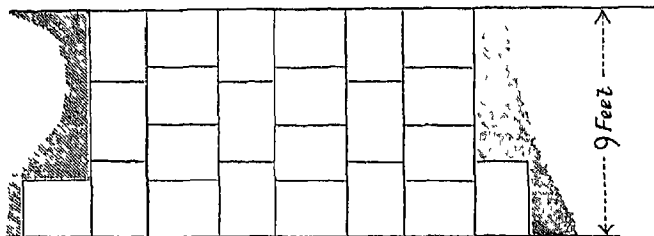
ESSEX EDUCATION COMMITTEE

(County Junior (Free Place) Scholarships Examination)

1. Find the one-seventy-fifth (1/75th) of £276 1s $10\frac{1}{2}$d
2. (*a*) Find the difference between $2\frac{1}{2}-1\frac{1}{4}$ and $1\frac{1}{4}-2\frac{1}{2}$.
   (*b*) Sum $2\frac{1}{3}-3\frac{3}{4}+2\frac{5}{6}$.
3. A cistern is ·74 full, and after 56 gallons are taken out the cistern is ·46 full. How much water can it hold when full?
4. A man bought a gramophone and 16 records for £7 14s. 6d. If the gramophone cost £1 14s. 6d. more than the records, how much did each record cost?
5. Eggs are bought at 4 for 7d. and sold at 3s. 3d. per dozen.
   (*a*) How much would be gained by selling 100 eggs?
   (*b*) How many eggs must be sold to gain £1 9s. 3d.?
6. A man's step is 30 inches long and his son's is 27 inches long. They are walking side by side towards a wood 1 mile 2 furlongs 20 yards distant, and the boy counts his steps After counting 1,000 steps he becomes tired, and his father carries him the remainder of the journey. How many steps does the father take carrying the boy?
   (1 furlong = 220 yards.)

7. The diagram given here represents the flagstones of a pavement which is 9 feet wide, and the diagram helps you to find the length and the width of a flagstone, as all the flagstones are of the same size.

Find (*a*) the area of one flagstone in square feet;

(*b*) how many stones will be required to make such a pavement 21 feet long (and 9 feet wide).

Mental Arithmetic

1. 241 articles at 2d. each.

2. Express 14s 6d. as the fraction of £1.

3. What is the difference between $\frac{1}{3}$ and $\frac{1}{8}$ of £1?

4. Give the sum of the odd numbers between 0 and 12.

5. How many inches in $1\frac{1}{3}$ yards?

6. The houses down one side of a street are numbered with odd numbers beginning at 145, 143, 141, &c, going downwards What is the seventh house, counting from 145 as the first?

7. In writing the word "irresistible" 63 times, how many times do you write the letter "i"?

8. 1625 divided by 125.

9. What is the cost of 50 eggs at 4s. 2d. per score?

10. How many cwts. in ·75 of 3 tons?

11. Subtract 3·75 from 4·5

12. If a boy works 9 hours for 5s. 3d., how much is that for 2 hours?

13. Add $\frac{1}{5}$, $\frac{1}{50}$, $\frac{1}{100}$ all together.

14. How much less than 2 is the sum of $1+\frac{1}{2}+\frac{1}{4}+\frac{1}{8}$?

GLAMORGAN EDUCATION COMMITTEE

(Examination for Entrance and Minor County Council Scholarships.)

1. (i) Multiply 2398 by 497.

(ii.) Without further multiplication give the answers to the following:

(1) 23·98×49·7,

(2) 239 8×0·497.

2. Fill in the missing terms in the following bill:

	£	s.	d.
15 lb of sugar at $3\frac{1}{2}$d per lb. . .			
yds. of flannel at $8\frac{1}{2}$d. per yd. . .		7	1
25 yds. of muslin at per yd. . .	1	1	$10\frac{1}{2}$
$3\frac{1}{2}$ doz. reels at 2 for $2\frac{1}{2}$d. . .			

3. A lady spends $\frac{1}{6}$ of her money at one shop, and $\frac{1}{5}$ of the remainder at another, and now has 24s. left. What did she have at first?

4. (i.) $2\frac{1}{4}-5\frac{3}{4}+7\frac{5}{12}$.

(ii.) From a yard of ribbon, $3\frac{1}{4}$ inches, $6\frac{5}{8}$ inches, and $7\frac{7}{12}$ inches were cut off. What length remains?

5. On each page of a book are 37 lines On which page will the 10,000th line come?

6. *A* and *B* set out from the same point and walk in opposite directions. *A* walks at the rate of $4\frac{1}{2}$ miles per hour, *B* at the rate of $3\frac{1}{2}$ miles per hour How long will they have been walking when they are 62 miles apart?

7. A train travelling at the rate of 40 miles an hour completes a journey in 3 hours 25 minutes How much less time would the train have taken if its speed had been 45 miles per hour?

8. By keeping close to the fence of a square field the farmer finds that by walking at the rate of 3 miles per hour he can walk once around the field in exactly 10 minutes. What is the area of the field in acres? (4,840 sq yards = 1 acre)

9. A man intends to make a garden path 30 yards long, but by mistake he used a metre stick instead of a yard stick. How much too long is the garden path? (1 metre = 39·37 inches.)

10. A man earns £5 4s. per week and saves a quarter of that sum every fortnight Find out how many weeks it will take him to save as much as he spends in 30 weeks.

Mental Arithmetic

1. Find the cost of 20 hats at 19s 11d each.

2. Multiply 160 by 125.

3. 481 stamps at $1\frac{1}{2}$d each.

4. If 4 litres = 7 pints, how many litres will there be in 63 gallons?

5. $4\times3\div2+5-6$.

6. 8d. + 2s. 6d. + 1s. 7d. − 1s 6d + 3s 3d

7. Add 0·5 of 10s 6d to 0·25 of 6s. 8d

8. A postage stamp is 15/16ths inches long. Give the length of 32 stamps placed end to end

9. Divide 675 by 25.

10. Share a shilling between Mary and John, giving Mary 1d. more than John

11. How many more hours are there in March than in February this year?

12. A man has 2s. 6d He spends $\frac{1}{3}$ of it and gives away 9d How much has he left?

13. 3 lb. of sugar at $3\frac{1}{2}$d. per lb. and $\frac{1}{4}$ lb. of tea at 3s. 4d. per lb. How much change will he get out of 2s ?

14. The distance round a square is 40 inches. What is its area?

15. $2\frac{1}{2}$ dozen lb. of currants at $6\frac{1}{2}$d. per lb.

THE CORPORATION OF GLASGOW

(Qualifying Examination—Card A.)

1. Find the value of:—

$$\frac{1\frac{1}{6}-\frac{5}{8}\text{ of }\frac{1}{2}}{\frac{5}{6}\text{ of }2\frac{1}{2}+1\frac{1}{4}}$$

2. Simplify:—

$$(97{\cdot}011-80{\cdot}82)\div(1{\cdot}125+{\cdot}375).$$

3. A man paid £265 for a number of calves and sheep. For 40 calves he gave £3 15s each. If each sheep cost £2 17s 6d, how many sheep did he buy?

4. Add 507 halfcrowns, 313 florins, 47 sixpences, 7 threepences, 119 pence.

5. Divide 597 tons 17 cwts. 1 qr 6 lbs. by 47.

Mental Arithmetic

1. Take three times six from five times nine
2. 379×9.
3. 300 articles at 1d. each.
4. 417 days at 3d per day.
5. How many ounces in $3\frac{1}{4}$ lbs ?
6. How many half inches in $3\frac{1}{2}$ feet?
7. How many half pence in three halfcrowns?
8. What is the value of $\frac{2}{3}$ of 1/9d.?
9. How many books at 9d. each for 15/-?
10. What must be added to ·68 to make 1?

(Qualifying Examination—Card B.)

1. Find the value of —

$$\frac{1\frac{1}{4}-\frac{1}{6}\text{ of }\frac{1}{2}}{\frac{5}{6}\text{ of }3\frac{1}{2}+1\frac{3}{4}}.$$

2. Simplify —

$$(97{\cdot}011-90{\cdot}36)\div({\cdot}1125+{\cdot}0375).$$

3. A man paid £530 for a number of calves and sheep. For 80 calves he gave £3 17s 6d. each. If each sheep cost £2 15s., how many sheep did he buy?
4. Add 503 halfcrowns, 217 florins, 39 sixpences, 11 threepences, and 113 pence
5. Divide 791 tons 12 cwts. 0 qrs 2 lbs by 59.

Mental Arithmetic

1. Take six times three from nine times five
2. 739×9.
3. 420 articles at 1d. each.
4. 313 days at 4d. per day.
5. How many ounces in $2\frac{1}{4}$ lbs ?
6. How many half inches in $2\frac{1}{2}$ feet?
7. How many half pence in 5 halfcrowns?
8. What is the value of $\frac{2}{3}$ of 2/3d.?
9. How many books at 8d. each for 12/-?
10. What must be added to ·86 to make 1?

GLASGOW SCHOOLS

(Qualifying Examination—Card A)

1. Bill —

   17 pints at 1/4 per gallon.
   7 yards 2 feet at 5/6 per yard.
   5 oranges at 1/3 per dozen.
   $3\frac{3}{4}$ dozen eggs at $1\frac{1}{2}$d each egg.

   Give the total amount of the bill and tell what change you would receive if the bill were paid with a five pound note.
2. Find the value of:—

   2 tons 7 cwts 2 qrs at £2 10/- per ton.
3. Subtract:—

   $\frac{2}{5}$ of $\frac{4}{7}$ from $\frac{7}{10}$ of $\frac{11}{14}$.
4. Simplify —

   $(2{\cdot}07\times1{\cdot}3)-(2{\cdot}2503-1{\cdot}3)$
5. 84 lbs. of sugar at $3\frac{3}{4}$d per lb are mixed with one cwt at $3\frac{1}{4}$d per lb., and the mixture is sold at 4d. per lb. Find the total profit

Mental Arithmetic

1. Write as decimals:—
   (*a*) Three thousandths.
   (*b*) Seven hundredths.
2. Four times nine minus three times seven.
3. $10/4+3/9+4/2-7/11$.
4. 10 articles at 1/11$\frac{3}{4}$d. each
5. From $\frac{2}{3}$ take $\frac{1}{2}$.
6. How often is $1\frac{1}{2}$ inches contained in a yard?
7. Which is the greater, ·18 or ·2?
8. How many minutes from 1.15 p.m. to 4 p.m.?
9. If $\frac{3}{4}$ of my money is £24, what is $\frac{1}{8}$ of it?
10. If I have 2d. more than you, and together we have 1/-, how much have I?

(Qualifying Examination—Card B.)

1. Bill:—

   25 pints at 1/4 per gallon.
   5 yards 2 feet at 6/3 per yard.
   7 oranges at 1/3 per dozen
   $2\frac{3}{4}$ dozen eggs at $1\frac{1}{2}$d. each egg.

   Give the total amount of the bill and tell what change you would receive if the bill were paid with a five pound note.
2. Find the value of:—

   3 tons 7 cwts 2 qrs. at £2 8/- per ton.
3. Subtract:—

   $\frac{2}{5}$ of $\frac{3}{7}$ from $\frac{7}{10}$ of $\frac{9}{14}$.
4. Simplify:—

   $(1{\cdot}09\times2{\cdot}3)-(3{\cdot}128\div2{\cdot}3)$.
5. 72 lbs. of sugar at $3\frac{3}{4}$d. per lb. are mixed with one cwt. at $3\frac{1}{4}$d. per lb., and the mixture is sold at 4d. per lb. Find the total profit.

Mental Arithmetic

1. Write as decimals:—
   (*a*) Four thousandths.
   (*b*) Nine hundredths
2. Six times eight minus three times nine
3. $10/7+3/8+4/2-7/10$.
4. 20 articles at 11$\frac{3}{4}$d. each
5. From $\frac{3}{4}$ take $\frac{1}{3}$.
6. How often is $1\frac{1}{2}$d. contained in 3/-?
7. Which is the greater, ·26 or ·3?
8. How many minutes from 8.15 a.m. to 11 a.m.?
9. If $\frac{3}{4}$ of my money is £36, what is $\frac{1}{8}$ of it?
10. If I have 3d. more than you and together we have 1/3, how much have I?

HAMPSHIRE COUNTY COUNCIL

(Junior Scholarships Examination.)

1. How much would it cost to give an orange and a bun to each of 749 school children, if the oranges are 14 for a shilling and the buns 2 for $1\frac{1}{2}$d.?
2. Draw 4 straight lines each 2 in. long and 4 straight lines each 1 in. long, so arranged that together they make exactly 4 squares.

3. If $11\frac{3}{4}$ gallons of milk cost 17s. $7\frac{1}{2}$d., how much should be paid for 5 pints?
4. To send a parcel by post we have to pay according to weight—

Up to 2 lb.	.	6d.
From 2 to 5 lb.	.	9d.
From 5 to 8 lb.	.	1s. 0d.
From 8 to 11 lb	.	1s. 3d.

What would be the total cost of sending these parcels:—9 parcels each weighing $1\frac{1}{2}$ lb.; 7 parcels each weighing $3\frac{3}{4}$ lb.; 3 parcels each weighing 2 lb. 2 oz.; 6 parcels each weighing $10\frac{1}{2}$ lb.?
5. A man agrees to put up a mile of fencing for £105. How much has he earned when he has completed half a furlong?
6. Dough loses ·15 of its weight in baking. How much dough will be needed to make fifty-one 4 lb loaves?
7. A farmer uses $\frac{5}{8}$ of a ton of manure per acre on one field and $\frac{7}{12}$ of a ton per acre on another field—each field contains 35 acres. How many more cwts. of manure are required for one field than for the other?
8. For my electric light I pay a fixed charge of 19s 6d. every three months, and in addition $\frac{3}{4}$d. for every "unit" of electricity I use. My bill for 1929 came to £7 17s. 0d. How many "units" did I use?
9. If one apple tree needs a space 36 ft square and one plum tree needs a space 18 ft. square, how many plum trees and apple trees will be needed for 45 acres of orchard, 9 acres of which are to be planted with plum trees?
10. Half the eggs in a basket were sold at 3d. each and the rest at $2\frac{1}{2}$d each. The total sum received was £2 15s. How many eggs were there at first?

Speed and Accuracy Test

1. How many yards are there in 99 miles?
2. Find the cost of shearing 1,000 sheep at 27s 6d. a hundred.
3. Find the cost of 600 eggs at 2s. 6d. a score.
4. How many books at 1s 8d each can be bought for 15s ?
5. Write down the difference between ·3 of £1 and ·25 of a guinea
6. How many 2 oz. bars of chocolate weigh 9 lb 4 oz.?
7. How many days are there in ·4 of a year?
8. The directions on a bottle of mouth-wash say:—"Use 3 parts of water to 2 parts of this mouth-wash." How much water should I take to 6 tablespoons of the mouth-wash?
9. On what day of the week will May 1st fall this year?
10. A snapshot 4 in. long and 2 in wide is enlarged, so that it is 8 in. long. How wide will it be?

KENT EDUCATION COMMITTEE

(Joint Examination for the award of Free Place Scholarships and Junior Exhibitions at Secondary Schools, Scholarships at the Day Technical School for Girls, the Day Trades School, Junior Departments of Schools of Art and for promotion to certain Central Schools.)

SECTION I.

Time allowed. 8 minutes.

Addition:

(1)

71
182
92
35

(2)

£	s.	d.
3	5	$9\frac{3}{4}$
4	1	4
	17	$3\frac{3}{4}$

Subtraction :

(3)

7031
598

(4)

yds	ft.	in
3	0	7
1	2	4

Multiplication :

(5) 456×900

(6) 8971×46

(7) £ s. d. 4 $3\frac{1}{2} \times 8$

Division:

(8) 6)93522

(9) 29)8903

(10) s. d. 7)13 $1\frac{1}{2}$

SECTION II.

Time allowed: 9 minutes.

Addition :

(1)

weeks.	days.	hours.
2	3	13
1	4	5

(2) Write in figures and add.

Two thousand and thirty-one =
Five hundred and twenty =
Ten thousand and fifty-three =

Subtraction :

(3) $6\frac{3}{4} - 3\frac{3}{8}$

=

(4)

tons.	cwts	qrs.
7	4	2
4	10	3

Multiplication :

(5) £233×35

Division :

(6) £ s d. 23)39 19 3

SECTION III.

Time allowed: 8 *minutes*

1. $8-11+9-2+4$.
2. (i) $7+\cdot 07+7\cdot 007$.
   (ii) $5-\cdot 68$.
3. (i) $\cdot 4\times\cdot 6$.
   (ii) $7\cdot 2\times\cdot 03$.
4. $168\cdot 168\div 7\cdot 8=21\cdot 56$
   What is (i) $16\cdot 8168\div\cdot 78$?
   and (ii) $\cdot 168168\div 2\cdot 156$?

SECTION IV.

Time allowed : 7 *minutes.*

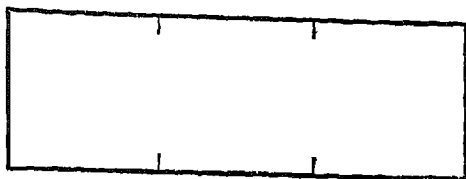
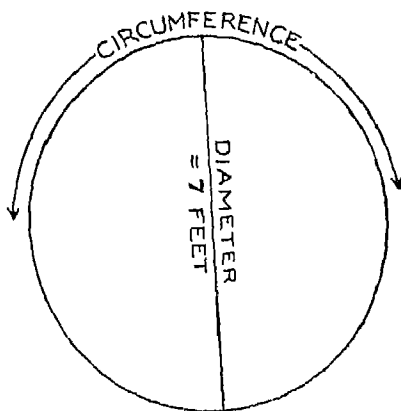
1. The Town Hall is 123 years old this year; in what year was it built?
2. Jack reached school at 8.43 a m., Tom came 25 minutes afterwards. At what time did Tom arrive?
3. How many gallons of milk are needed for each of 72 children to have half a pint?
4. A biscuit weighs $\frac{2}{3}$ oz.; how many such biscuits go to 1 lb.?
5. Three ices and four cakes cost 1s. 6d.
   Six ices and seven cakes cost 2s. $10\frac{1}{2}$d.
   What will one ice and one cake cost?
6. $2\frac{1}{4}$ lbs of China tea cost 6s. What will 3 lbs of the same tea cost?
7. A paint box and a pencil case together cost 4s. 2d ; the paint box costs one and a half times as much as the pencil case.
   What is the price of the paint box alone?

SECTION V.

Time allowed: 18 *minutes*

1. A garden plot of area 40 square poles has to be dug and weeded; Jack does $\frac{1}{5}$ of it, Tom does $\frac{1}{4}$, Dick does $\frac{1}{8}$, and George does the rest.
   How many square poles does George do?
2. Find the total cost of
   3 score pairs of scissors at 1s 9d per pair.
   2 dozen cotton reels at $2\frac{1}{2}$d each.
   1 gross papers of pins at $10\frac{3}{4}$d. per dozen papers
   (1 score = 20. 1 gross = 12 dozen)

3. Our field is oblong in shape; it is three times as long as it is wide If I walk right round it five times I have walked a mile. How many yards wide is it?

   (1 mile = 1760 yards)

4. The circumference of a circle can be found by multiplying its diameter by $3\frac{1}{7}$.
   (i) What is the circumference of a round flower bed 7 feet in diameter?
   (ii) What will a border of pansies cost if they are planted round the edge at intervals of 1 foot, if each pansy plant costs 3d.?

5. An aeroplane flies at the rate of 330 miles in 1 hour.
   (i) How many minutes will it take to fly 11 miles?
   (ii) How many yards will it fly in 3 seconds?

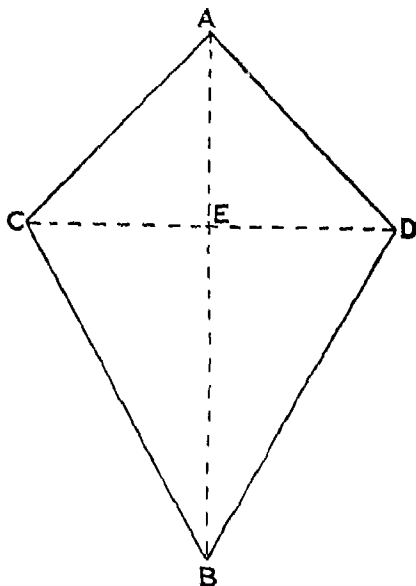
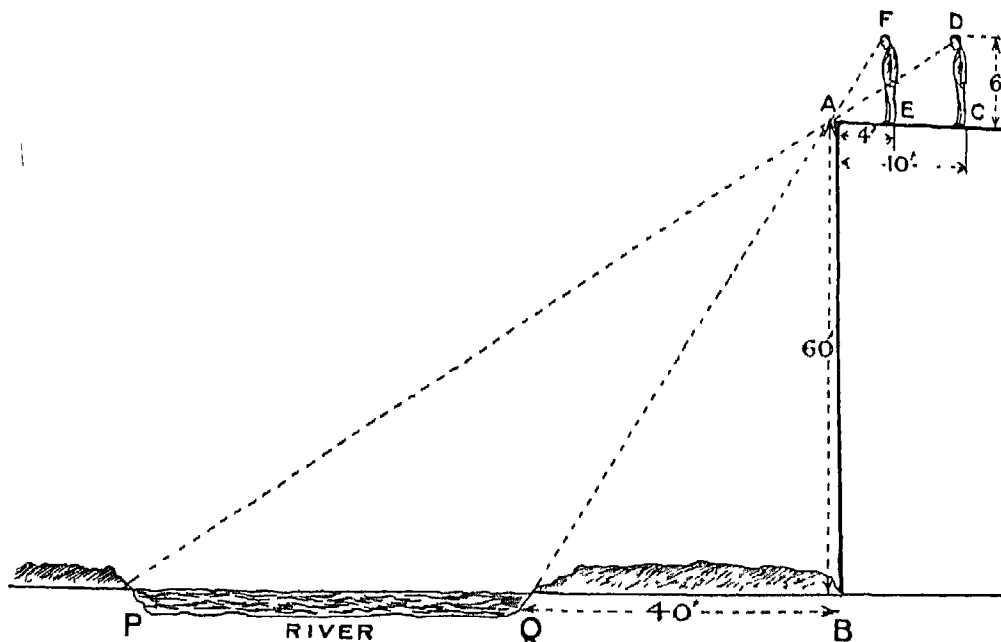
6. A Savings Certificate costs 16s.; at the end of the first year it is worth 16s 3d., after that it increases in value by 3d every 4 months. A certificate was bought on January 1st, 1926. What was it worth on May 1st, 1930?

SECTION VI.

Time allowed. 10 *minutes.*

1. A man bought bananas at 15 for a shilling and sold them at 10 for a shilling. If he made a profit of 15s. by doing this, how many bananas did he buy?

2. Find the area of the kite shown in the diagram.

   AB = 27 inches
   CD = 20 inches.
   AB = 3 times AE.

3. AB is a tower, 60 feet high.
EF is a man on top, 4 feet from the edge.
He can just see Q, the near bank of a river below
He goes 6 feet further back to position CD, 10 feet from the edge.
He now just sees P, the far bank of the river.
The near bank Q is 40 feet from B, the foot of the tower.
The man's eyes are 6 feet from the floor.
How wide is the river?

The figure is *not* drawn to scale, so a correct answer can be got only by thinking, not by measuring.

LEICESTERSHIRE COUNTY COUNCIL

(Annual Schools Examination.)

PAPER II.

1. Multiply £9 4s. 7½d. by 19.
2. Take 2 tons 17 cwts 2 qrs. from 3 tons 12 cwts 1 qr.
3. Divide 141 mls 3 fur. 30 yds by 42.
4. Reduce 18 gals. 2 qts. 3 pts. to *pints*

PAPER III.

1. A jar full of water weighs 30 lbs.; when half full it weighs 22 lbs What does it weigh empty?
2. A family going to the seaside requires 3 whole tickets and 5 half tickets A whole single ticket costs £1 5s 4d What is the cost of the return journey for the whole family?
3. An electric light company charges 6d. per unit. What amount does a man pay whose house is supplied by two meters which read as follows:—

	1st Meter.	2nd Meter
Beginning of period .	3179	575
End of period .	3241	610

4. A taxi travels at 12 miles an hour The charge for the journey is at the rate of 1s per mile travelled and 6d. for every five minutes it has to wait What is the charge for a journey of 3 miles which took, including halts, 25 minutes?

Mental Arithmetic

1. What are the prime factors of 30?
2. How many times is 4 ins. contained in 4 yds.?
3. If 1 gallon of water weighs 10 lbs., what does 1 pint weigh?
4. What fraction of a sovereign is 1s. 3d ?
5. Reduce $\frac{100}{125}$ to its lowest terms.
6. After spending $\frac{3}{5}$ of my money, what fraction of it remains?
7. The distance round a square is 18 ins. What is its area?
8. Multiply ·1 by ·01.
9. Take $\frac{1}{4}$ from $\frac{1}{3}$
10. What will 5 dozen articles cost at 5 for 6d.?
11. Find the cost of 3 yards at 3s 11d per yard?
12. If November 28th is a Tuesday, what is the date of the following Tuesday?
13. What number is halfway between $3\frac{1}{4}$ and $2\frac{3}{4}$?
14. I spend 4s $10\frac{1}{2}$d and have 5s. $1\frac{1}{2}$d. change. How much had I at first?

LONDON COUNTY COUNCIL

(Preliminary Examination for Junior County Scholarships.)

PAPER A

1. Multiply 64,703 by 709.
2. From the product of $3\frac{1}{3}$ and $1\frac{1}{6}$ take $1\frac{1}{5}$.
3. From 3 gall. 1 qt. 1 pt take 1 gall. 2 qts
4. The cost of 50 feet of wire is 1s.; what would be the cost of 10 miles of this wire?
5. A bar of iron is $10\frac{1}{2}$ in long Its length is cut down to 9 in. What fraction of the whole is cut off?
6. How many words are printed on 3 pages of a book, if each page contains 25 lines and each line contains 11 words?

PAPER B

1. What is the difference in cost between 49 articles at 1s. 3d each and 6 articles at 9s. 11d. each?
2. A man lost $\frac{3}{8}$ of the money which was in his purse; what fraction was this of the money that remained?
3. Twenty-four American dollars are worth as much as five English pound notes How many American dollars are worth as much as £10 16s 8d ?
4. Show that the difference between $\frac{7}{11}$ and $\frac{7}{18}$ is equal to their product
5. Electricity can be paid for either (*a*) by paying a fixed charge of 24 shillings for three months and then $\frac{1}{2}$d. for each unit of electricity used, or (*b*) by paying 6d. for each unit used and a meter rent of half-a-crown every three months.
   If a man uses 50 units of electricity in three months, which is the cheaper method of payment and how much would he save?

(Final Examination for Junior County Scholarships)

PAPER A.

1. Divide £4 14s. 11d. by 17.
2. A girl fills 240 boxes each hour. How many boxes can she fill at this rate between 10.20 a.m. and 12 10 p.m.?
3. Add 17 oz to a third of 25 lbs. 5 oz. Give the answer in ounces.
4. What fraction is 8s. 9d. of two guineas?
5. A board is $5\frac{1}{2}$ feet long and 30 inches wide. What is its area in square feet?
6. $\frac{5}{8}$ of a tank is filled with water. Four gallons of water are drawn off and then the tank is half-full of water. How much water will the tank hold?
7. Find the value of 5480—3701+2947
   Without any further working write down the value of 5·48—3·701+2·947.
8. A greengrocer bought some apples and sold them at 3d. a lb. Out of each £1 he received 3s. 4d was profit. What price per cwt. did he pay for the apples?
9. What is the difference between $(20-\frac{4}{7})$ and $(10+\frac{1}{4})$?

PAPER B.

1. If 67 articles are worth £33, find the value of each article to the nearest penny
2. A ship took 29 days to complete a voyage at an average speed of 13 miles per hour. At what speed would it complete the voyage in one day less?
3. A quarter of the money in a purse was divided between Alice and Fred so that for every 2d. which Alice received Fred had $2\frac{1}{2}$d. What fraction of the money originally in the purse did Fred receive?
4. It cost £5 to put a fence round a garden which was twice as long as it was broad. What would it cost to put a similar fence round the garden if its width were the same, but its length were reduced by a quarter?

5. A man kept his savings in two boxes, one for his holidays and the other for a new suit. One day he put 3s 6d in the suit box when he meant to put it in the holiday box Three weeks after he put 5s. in the holiday box instead of in the suit box. He made no other mistakes. Some time later he went to the suit box expecting to find £4 10s. od. How much money did he find in it?
6. Seventeen girls each received equal shares of a sum of money. The same amount of money was divided in equal shares between twenty-three boys Each boy received a shilling less than each girl. How much money did each girl receive?
7. Twenty-five wooden blocks, each 5 inches by 1 inch by 1 inch, were built into a cube so that two opposite sides of the cube each showed twenty-five squares, each a square inch. These two sides were painted black; the rest of the outside of the cube was painted green.
   (*a*) How many faces had each of the twenty-five blocks?
   (*b*) What area in square inches was painted black?
   (*c*) How many of the blocks had two black faces and two green faces?
   (*d*) How many of the blocks had no green colour at all?

MINISTRY OF EDUCATION FOR NORTHERN IRELAND

By permission of the Controller of H.M. Stationery Office.

(Secondary School Entrance Scholarship Examination)

1. (*a*) Add together $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{4}{5}$ and $\frac{5}{6}$
   (*b*) Multiply 74·464 by 2·25.
   (*c*) Find the difference between $\frac{7}{8}$ and ·097.
2. In a gymnasium class, one boy can jump 5 ft 10 in., five can jump 5 ft 8 in, nine can jump 5 ft. 6 in, and two can only manage 4 ft 11 in.
   (*a*) What is the average height of jumping?
   (*b*) How much per cent. is the highest jump above the average?
3. If $5\frac{1}{2}$ tons of new pennies are worth £2,200, what is the weight of 75 pennies?
4. A man does ·713 of a piece of work for £35 13s od How much should he be paid for the remainder at the same rate?
5. A reservoir, 121 yards long and 40 yards wide, of uniform depth, contains 2,613,600 gallons of water. What is the depth of the water?
   (1 gallon=288 cub in)
6. A rectangular garden is 61 ft. long and 26 ft wide. A path is made all round it, 3 ft. wide, and three circular beds, two 14 ft in diameter and one $10\frac{1}{2}$ ft in diameter, are laid out· the rest is put under grass. Find the area under grass
   ($\pi=\frac{22}{7}$)

COUNTY OF NORTHUMBERLAND EDUCATION COMMITTEE

(Secondary Schools Admission Examination.)

1. Multiply 765 by 89
2. How many inches are there in 18 yds o ft. 9 ins. of cord? Find how many pieces 9 inches long can be cut from it.
3. A man bought 25 yards of cloth at 3s 6d a yard He sold it at a profit of 9d. a yard How much did he receive in all?

4. A grocer has 3 qrs 8 lbs. 4 ozs. of sugar and sells 1 qr 21 lbs. 12 ozs. How many half-pounds has he left?

5. (i) Simplify: $\frac{2}{3}+\frac{5}{12}-\frac{3}{4}$.
(ii) From 3·4 take 1·651.

6. A farmer bought a cart, 5 horses, and 2 pigs for £419. The cart cost £35, and each horse 20 guineas Find the cost of one pig

7. A shopkeeper buys 500 eggs for £4 16s. 3d. He finds 8 are broken and have to be thrown away. If he sells the rest at 2s 9d. a dozen, what profit does he make?

8. A housekeeper takes 3 half-pints of milk each week-day and one pint on Sunday. Her milk bill for the week comes to 1s. $5\frac{1}{2}$d. What is the price of milk per quart?

9. A grocer mixes 4 lbs of chicory at 3d. a lb. with 17 lbs of coffee at 2s. od. a lb. He sells the mixture at 2s. 1d. a lb., what does he gain?

10. On a tram-car I can travel 3 miles for 2d. By railway I am charged 1s. 6d for 15 miles. How much more will it cost me to travel 345 miles on the railway than on the tram-car?

11. A dealer orders a truck of coal containing 9 tons at 15s. a ton. The coal is conveyed 80 miles by rail, and then the total cost of coal and carriage is £11 5s. od. What does it cost to carry 1 ton for a mile?

12. There were 67 men working on a building. Of these, 39 were bricklayers at £2 5s. od. a week, 9 were masons at 3 guineas a week, and the rest were joiners at £2 15s. od. a week. How much would be left out of £350 after paying their wages for a fortnight?

COUNTY COUNCIL OF THE WEST RIDING OF YORKSHIRE

(County Minor Scholarships Examination.)

Senior.

PART I. ACCURACY TEST.

1 (*a*) Multiply 786 by 109.
(*b*) How many square inches are there in an oblong $9\frac{3}{4}$ inches long and $2\frac{1}{4}$ inches wide?

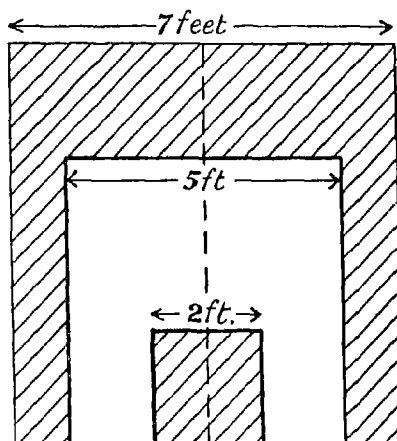
2. (*a*) Find the total length of
$11\frac{1}{2}$ in $+7\frac{7}{8}$ in. $+2\frac{5}{12}$ in $+\frac{1}{4}$in
(*b*) How much longer than 1 mile 5 furlongs 8 chains is 3 miles 5 furlongs 7 chains?

3. (*a*) Find in £ s d the value of 3199 threepenny pieces
(*b*) If 14 lb of butter costs 18s $4\frac{1}{2}$d., how many lb. of the same butter can be bought for 5s. 3d ?

PART II. PROBLEM TEST.

Be careful to show **how** *you do every sum.*

4. A man bought $3\frac{1}{2}$ tons of coke at 23s. 10d. a ton He weighed this coke out into 140 bags which he sold at 11d. a bag.
(*a*) How much profit altogether did the man make?
(*b*) If each bag contained the same weight of coke, how many pounds less than $\frac{1}{2}$ cwt. did the coke in each bag weigh?

5. Below is the plan of a design made from three squares set evenly about the dotted middle line The sides of the squares are respectively 7 feet, 5 feet and 2 feet.
(*a*) Find the total length of the thick black outline.
(*b*) Find the total area shaded.

6. An English girl in Paris bought 7·5 metres of silk at 24 73 francs a metre At that time £1 of English money could be exchanged for 123·65 francs of French money What did the silk cost the girl
   (a) in French money?
   (b) in English money?
7. Mr. *A* set off by aeroplane for Australia at 6 a m on August 15th and reached Sydney at noon on September 2nd Mr *B* sailed for Australia at noon on September 30th and reached Sydney at 5 p m. on October 29th. How many days and hours did Mr *A* save by flying?
8. Thirty-four boys and three teachers went camping for a week Each boy paid the same amount, but each teacher had to pay ten shillings more than a boy's share. The total expenses were £25 6s. 4½d What was a boy's share?

Mental Arithmetic

1. How much money must be added to £3 19s. 11d to make £5?
2. What is the cost of five knives at 1s. 3d each together with five spoons at 9d each?
3. Find the cost of ¾ lb of chops at 1s 10d. a lb
4. Write in decimal form 301 hundredths
5. What is the cost of 7½ yards of material at half a crown a yard?
6. What is the cost of 1 gall 3 qt. 1 pt of milk at 7d a quart?
7. If you count from one end of a row of girls, Joan is the 9th girl, but if you count from the other end of the row, she is the 22nd girl How many girls are there in the row?
8. If a boy writes £0 5 in error for £0·05, by how many shillings is he wrong?
9. The price of bacon has fallen from 1s 3½d to 1s 2d a lb What difference does this make in the cost of 160 lb. of bacon?
10. How many minutes are there from 11 33 a m. to 1 13 p.m on the same day?
11. If an upright stick 5 feet high throws a shadow 2 ft. 7½ in long, how long will be the shadow of an upright stick 2 ft 6 in high?
12. A quarter of a pole is painted blue One-eighth of the pole is painted green The rest of the pole is painted white If the white part of the pole is 3 ft 4 in. high, how high is the whole pole?

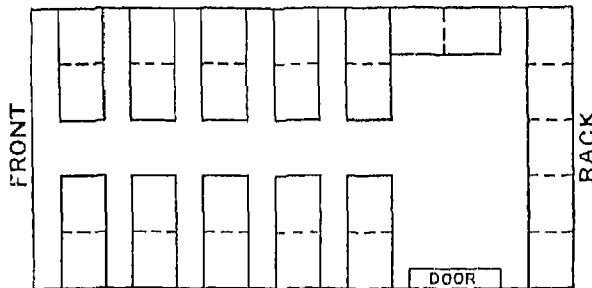
Junior.

PART I. ACCURACY TEST

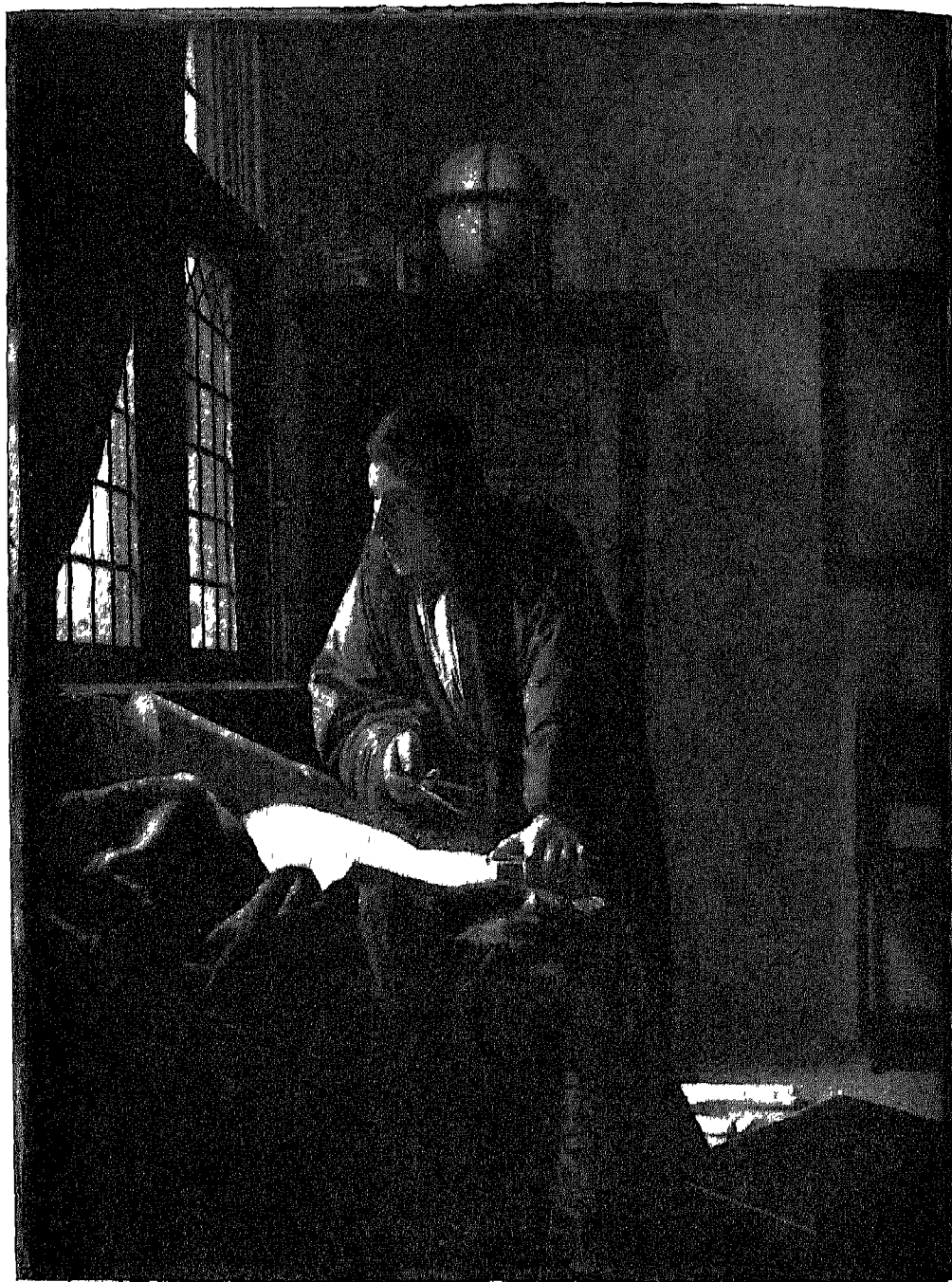
1. (a) Multiply 647 by 99
   (b) Divide 4105 by 40.
2. (a) Find the total length of
   1 ft. $5\frac{3}{4}$ in. + $11\frac{3}{4}$ in. + 2 ft. $4\frac{3}{4}$ in.
   (b) Find the sum of money which must be added to £29 5s. 9d. to make £43 5s. 6d.
3. (a) How much is left after subtracting 0·7 from 10·02?
   (b) How many yards of material at 1s $10\frac{1}{2}$d. a yard can be bought for £4 10s?

PART II. PROBLEM TEST.

4. A boy who was sent to pay this grocer's bill found that he was $9\frac{1}{2}$d. short of the money he needed. How much money did he take to the shop?

   Bill. 4 boxes of matches at 9d. a dozen.
   14 lb. of barley at $2\frac{3}{4}$d. a lb.
   3 lb of bacon at 1s. $2\frac{1}{2}$d a lb.
   $2\frac{1}{2}$ lb. of butter at 1s. 5d. a lb
   $\frac{1}{4}$ lb. of tea at 2s. 6d. a lb
5. A wooden box holding a gross of exercise books weighed 42 lb 4 oz. The same box, holding only ten dozen of the same exercise books, weighed 35 lb. 8 oz. What is the weight of one of these exercise books?
6. A school year is 44 weeks long, and the school allows a full ink-well for each pupil every four weeks. If half a pint of ink fills 30 ink-wells, how many gallons of ink are used in one school year by a school of 240 pupils?
7. Below is a simple plan of the seats in a motor 'bus. Each passenger is allowed the same amount of seating space.

   (a) The eleven double seats are each built 3 feet long and 1 ft. 3 in. wide, and the back seat is built for 5 persons. How wide is the inside of the 'bus?

   (b) In front of each person's seat a space of 9 inches is left free for leg room. How long is the inside of the 'bus?
8. Eleven boys and their schoolmaster went camping for a week Each boy paid the same amount, but the master had to pay ten shillings more than a boy's share. The total expenses were £6 3s 6d. What was each boy's share?

THE TEACHING OF SIMPLE GEOMETRY IN THE PRIMARY SCHOOL

From the painting by Jan Vermeer—Frankfort *[Photo Medici Bruckman*

THE ASTRONOMER

THE TEACHING OF SIMPLE GEOMETRY IN THE PRIMARY SCHOOL

Introduction.—The *Report of the Consultative Committee on the Primary School* states the general admission that too much time is devoted to arithmetic in the primary school, and regrets that little attention is given to geometry. No definite course of geometry is there suggested

There is no general agreement among teachers as to what geometry should be taught in the primary school Some teachers believe that enough is done in the way of geometry if the pupils can work out some of the simpler problems in the mensuration of the square and rectangle, and some would have the children put through a course similar to that of a preparatory school, with its demands for definitions, logical arrangement and proofs

The course of work outlined in this section has been arranged to meet, as far as possible, the general needs of all teachers in the primary school. By following the course the child should, at the end of it, have some general notions of size and shape; he should be able to recognise the commoner solids and plane figures and use correctly the names of the parts, and he should be able to use the ruler, set square, compasses and protractor in simple constructions.

A slightly different course, based on a teacher's reasoned opinions, would in his hands be at least as helpful to his class as the course here outlined In no subject does the spirit count for more in comparison with the letter.

In the teaching of mathematics, probably more than in any other subject, though progress is certainly desirable, neither the pupil nor the teacher should be forced too fast. A little at a time is the most satisfactory way with the young pupils. At the same time, if each lesson is not part of a planned scheme, the work is almost certain to become desultory As in the teaching of arithmetic constant revision is absolutely necessary.

Solids.—The child's first experiences are with geometrical solids, objects which he can handle The idea of a surface and of a point comes later His first geometrical ideas should also come from objects which he can handle

In geometry two comparisons are of chief importance,—the comparisons of size and shape Questions of colour, of material, etc , do not enter into it.

With two irregular bodies even young children can tell quite easily that they are not of the same shape, and, unless in exceptional circumstances, which of the bodies is larger. In making these statements they do not consider what defines shape, or what measures size. No reasons need be given for their intuitive decisions.

If a number of solids are taken,—rectangular blocks, cubes, prisms and pyramids of various kinds, cones and spheres,—the pupils can usually pick out those which have the same shape.

Few of the shapes are entirely new to them. They are accustomed to boxes, balls, ice-cream cones, cylindrical pipes, etc.

The correct names can be given to the solids No attempt need be made to define

them. If the children see and handle the different forms, they can distinguish them as they distinguish an apple from an orange,—without very clearly recognising the nature of the points of difference.

Surfaces and lines.—The mathematical idea of a surface is difficult for a child to grasp, and it is probably best at this stage merely to take examples. He swims *in* the water, but he slides or skates *on* the ice; he cuts *into* wood, but he writes *on* a paper surface; he drives a nail *into* a board, but he paints the surface of the board. For skating the depth of the water need not be considered, but it must be for swimming; and a similar fact is true in the other cases

The surfaces can be pointed out in the case of a simple solid,—say the rectangular block. How many surfaces are there?

Consider what separates two of the surfaces,—what the pupils regard as a sharp edge. Mark it lightly with chalk and let the pupils recognise it as a line

Deal with a pyramid in the same way.

Now consider a cylinder. Point to surfaces and lines in the cylinder. Is there any difference between them and those in the rectangular block?

Children generally say that the surfaces in one case are flat, but not in the other case; or that the surface of the cylinder is round.

At this point there should perhaps be a word on the attitude towards definitions with young children A logical treatment of geometry must start off with definitions, postulates, etc , and teachers, who have gone through a logical course of geometry, are inclined to regard these as the starting point for children. It ought to be kept in mind that what come first are the object to be defined, and the facts or properties which distinguish it from other objects; the concise statement of what the object is comes second. Young pupils may find it fairly easy to distinguish a rectangle, for instance, from another quadrilateral; and yet find it difficult to say what exactly the distinguishing features are. For them the question to be answered should not be "What is a rectangle?" It should be "Which of the figures shown are rectangles?" Can they make a rough sketch of a rectangle? In other words they should distinguish intuitively the rectangle from the non-rectangle

If a class can grasp a definition, so much the better. The mechanical repetition of a definition is, however, of little use

With young pupils a flat surface is an accurate enough statement for a plane, provided they show their ability to point to planes (or flat surfaces) and to surfaces which are not planes The use of the word plane for flat surface should certainly be encouraged.

The pupils should be taught the correct use of the terms *face*, *edge* and *vertex* as applied to a solid figure

The names for the simpler plane figures forming the faces,—square, rectangle, triangle, circle,—can also be given, the definitions again being unnecessary

The pupils should fill in the table.

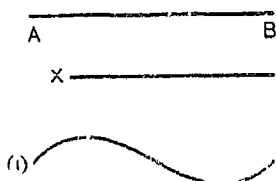
Name of Solid	Number of plane surfaces	Number of curved surfaces	Number of straight edges	Number of curved edges	Number of vertices
cube					
rect block					
cylinder					
sq pyramid					
cone					
sphere					

The construction of a table like this should be explained,—that it puts in a concise form the answers to such questions as:—

(i) What is the name of this solid?
(ii) How many plane surfaces has it?

Points, straight lines, curved lines.—With young children it is unnecessary to lay any stress on the mathematical definitions of points, etc An object with no magnitude, or with length but no breadth, is outside their experience The ideas of children with regard to position, as apart from the place where some visible object lies, are of the vaguest They can see that a moving point, represented by the point of a pencil or a piece of chalk, traces out a line, but they cannot grasp the idea of a mathematical line being traced out by a moving mathematical point Their idea of the line is therefore unconnected with their idea of the point, and there is no need to press the connection between these ideas

A point is usually marked and named with a pin-hole or a dot with a letter beside it,—as ·A, meaning "the point A." The use of two short intersecting lines, though more correct, is often found confusing with younger children

FIG I.

A line is named by means of two letters on it, or by a single letter, e g the line AB, the line X, the line (i).

The pupils' ideas of straight lines and curved lines are quite satisfactory if, with a number of lines drawn as under, they can deal with questions such as these.

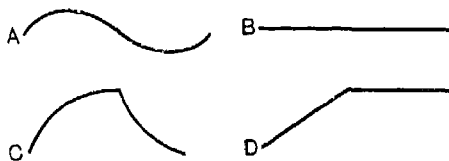



FIG 2

(i) Point to a straight line, or, write down the names of all the straight lines
(ii) Point to a curved line, or, write down the names as in (i)
(iii) Is the line D straight or curved?
(iv) How would you find if B is straight or not? (Use of straight edge or stretched thread)
(v) Could the same method tell if a line was curved?
(vi) How many lines can be drawn joining the points A and B? How many of these are straight lines? Which do you think the shortest of all these lines?

The measurement of straight lines.—The pupils should be led to see the need for a unit of length by such questions as these —

(i) Which of the two straight lines A and B is longer?
(ii) Which edge of this rectangular block is longest? Are all the edges of different lengths? Can you show any two edges which seem to have the same length?
(iii) Take two straight lines of nearly the same length. How would you find out which was longer?

The stretched string is usually suggested, though of course a large part of any class immediately suggests the use of the ruler

An explanation should be given of the unit of length,—a fixed length with which any other can be compared. The child of 7+ should know the linear table up to yards.

Even at this stage it can be pointed out that a line need not be measured in inches. Most rulers have one side divided in centimetres, and this unit can also be explained, with the linear metric table up to the metre. To what extent this unit is used must be left to the discretion of the individual teacher There is, however, no greater difficulty in its use than in that of the inch, and the pupils should be introduced as soon as possible to a system which, later on, largely replaces the British system.

The children can now be taught to measure straight lines.

It is probably best to start off with a diagram.

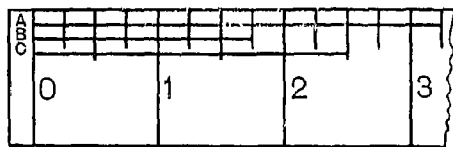



Fig. 3

State the lengths of A, B, C, etc.

For practice the inch may be divided (i) into quarters; (ii) into eighths, (iii) into tenths.

Measurements in terms of all these fractions need not be attempted at the same time. The teacher should be guided by the progress of the class

There is some difference of opinion as to how early the decimal notation can be introduced to children. The writer feels that as a rule decimals are delayed too long, and that as soon as the child clearly understands "place value" there is no difficulty in introducing decimals, at least to the first decimal place. The use of decimal fractions greatly simplifies the arrangement of results.

"The use of the straight edge in measurement in inches and tenths of an inch, or in decimetres, centimetres, and millimetres, will introduce the notation of decimal fractions, and the addition or subtraction of lengths so measured will show that these processes as applied to decimals are essentially the same as those employed in dealing with whole numbers." *Report of the Consultative Committee on the Primary School.*

The class can now be set to measure the edges of various solids,—rectangular blocks, cubes, prisms and pyramids. The degree of accuracy,—to the nearest $\frac{1}{4}$ in., $\frac{1}{8}$ in., or $\frac{1}{10}$ in.—will depend on the class. The measurements may be made at different times, with different degrees of accuracy If possible the results should be tabulated as in the following example.

Rectangular Block

	Lengths of longest edges	Lengths of shortest edges	Lengths of other edges
(i)			
(ii)			
(iii)			
(iv)			

If the pupils can understand a perspective diagram, the above table might be replaced by the following.

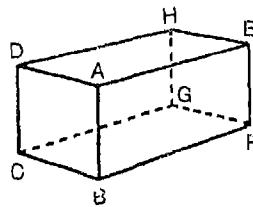



Fig. 4.

AE =	AD =	AB =
BF =	BC =	EF =
CG =	FG =	HG =
DH =	EH =	DC =

The other figures can be treated in the same way

It should be noted that the straight line can be measured more easily and more

accurately if the ruler is held upright as in the diagram

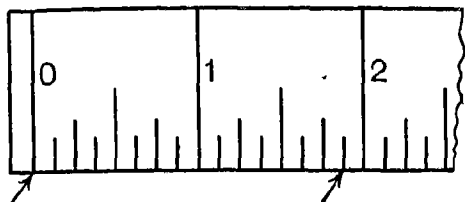



FIG 5

If, however, the ruler is left flat the eye should always be above the point whose reading is being taken

If yardsticks are available practice can be given in measuring objects in the class-room like desks (length and breadth), tables, windows, etc If the teacher shows how yards can be "ticked off" along one of the walls, the length and breadth of the room can be found

Quite satisfactory yardsticks can be made of thick cardboard, the "sticks" being divided in inches

These distances may also be measured in metres, decimetres and centimetres, if metre-sticks are available Satisfactory re-productions of these can also be made from cardboard

Drawing straight lines of given length.—Young pupils find it difficult to draw neatly a straight line of given length. The easiest way is to draw a straight line slightly longer than that required, mark a point on it, and then, using the ruler as in measuring a line, mark a second point at the given distance from the first This gives the line as under.

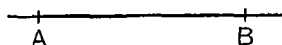



FIG 6

If necessary, the parts of the line beyond A and B can be erased.

EXERCISES

1. Fold a piece of paper What kind of line is the crease? Can you fold the paper (without crushing) so as to get a curved crease?
2. Measure the given straight lines (preferably reproduced by cyclostyle) in inches and in centimetres
3. Mark four points on paper How many lines can be drawn joining any two of these points? Measure all these lines
4. Draw a straight line AB, 4 in in length Find C and D in AB so that AC=1 in, and DB=$1\frac{1}{2}$ in Measure CD
5. Draw straight lines 2 in, 3 in, 4 in, 5 in. in length Measure these lines in centimetres How many centimetres are in an inch? [Or, how many millimetres are in an inch?]
6. If 1 inch represents a mile, what would represent 2 miles, 5 miles, $\frac{1}{2}$ mile?

   Draw lines to represent 3 miles, $1\frac{1}{2}$ miles, $\frac{3}{4}$ mile.

Parallel straight lines and perpendicular straight lines.—Before dealing with rectangles, squares and parallelograms, the terms parallel and perpendicular should be explained. The definitions are difficult and should not be attempted

Pairs of parallel straight lines may be pointed out on one of the solid figures,—the cube or the rectangular block

Two parallel lines can then be shown on the blackboard, and also two non-parallel lines

In the same way a pair of perpendicular lines may be shown on the cube, and, on the blackboard, a pair of perpendicular lines and a pair of non-perpendicular lines can be drawn.

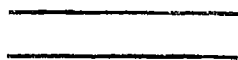
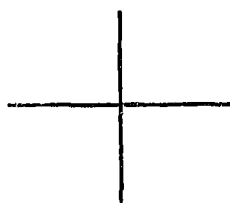
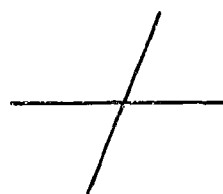



FIG. 7.

This may be followed by examples of such lines from the school furniture; lines in the children's notebooks; the edges of the book-pages, etc,—until, without being able to give a definition, the pupils recognise clearly the difference between parallel and non-parallel lines, perpendicular and non-perpendicular lines.

FIG 9

The children can then take examples from outside the school, mostly approximate: lines of houses in a street, hedges or walls along a road, tramway lines, cross-roads, telephone wire and pole, etc.

In particular note that the two short sides of a set square are perpendicular to each other Also, the direction east or west is perpendicular to the direction north or south.

In the explanation of perpendicularity the term right angle should be avoided. It opens up a wide subject which at this stage would be found difficult.

The diagram explains the method

The pupils can be taught the mathematical shorthand,—AB || CD and AB ⊥ CD, for AB is parallel to CD and AB is perpendicular to CD.

When the pupils are familiar with the construction, the teacher should insist on a clear statement of it, step by step. Apart from helping to fix the construction in the mind, the making of such a statement is a valuable lesson in oral composition.

Construction of a straight line parallel to a given straight line.—

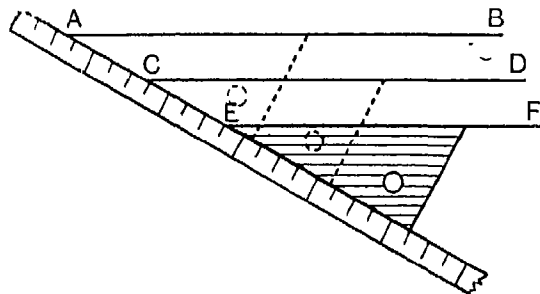



FIG 8.

By means of a set square and a ruler (kept quite steady), straight lines like AB, CD, EF can be drawn. It is obvious that these lines are parallel.

This fact is used to draw a straight line through a given point parallel to a given straight line.

Construction of a straight line through a given point perpendicular to a given straight line.—

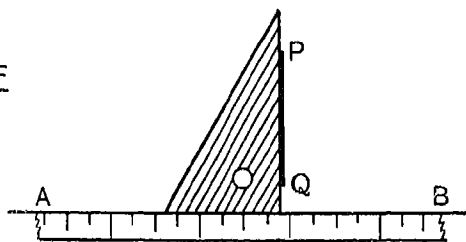



FIG. 10.

The diagram explains the construction the ruler AB being placed along the given straight line The perpendicular to AB is drawn through the point P As the vertex of the right angle is generally rounded by use, only part of the perpendicular (say PQ), should be drawn, and produced to cut AB

The perpendicular through P to AB may also be drawn by a method similar to that for the parallel.

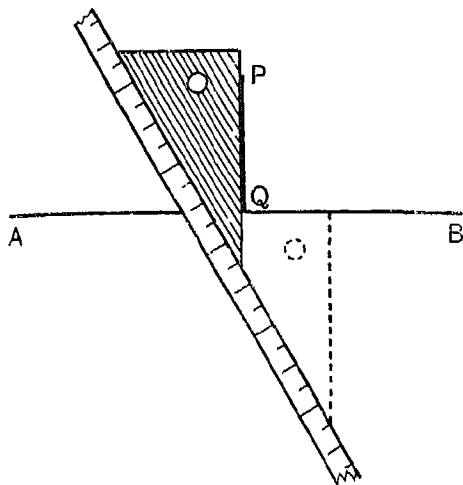



FIG 11

The diagram explains the method.

Vertical and horizontal lines.—These lines are so common that all pupils should have an idea of their meaning A vertical line is the position taken up by a string at rest when a weight like a stone is hanging at the end. This position can easily be shown to a class. A horizontal line is one which is perpendicular to a vertical line. The class-room and its immediate neighbourhood give plenty of examples of such lines

Mention should be made of the plumb line, used by bricklayers, and of the spirit level.

EXERCISES

1. Fold a piece of paper so that one part of a straight edge falls exactly along the other part of the same edge. What can you say about the crease and the edge? Prove it, using a set square.
2. In the same way make another crease What is true about the two creases? Prove by means of a straight edge and set square
3. Fold a piece of paper. Fold it a second time so that one part of the fold is along the other part. What is true about the two creases? Verify
4. Draw two parallel lines. Draw a straight line perpendicular to one of these lines. Show that it is also perpendicular to the other
5. Draw two parallel lines Draw three straight lines perpendicular to one of them (and thus, of course, perpendicular to both) Measure the parts of the three lines between the parallels.
6. Draw a straight line AB $1\frac{1}{2}$ in. long Using the set square, draw AC perpendicular to AB, making AC=2 in. Measure BC. [$2\frac{1}{2}$ in.]
7. Draw two parallel straight lines of the same length Join their ends (not the opposite ends) and show that the joins are equal and parallel.
8. Draw the diagram shown AB=BC=CD=1 in. AE=$4\frac{1}{2}$ in Join DE. Draw CF, BG parallel to DE By measurement show that AG=GF=FE.

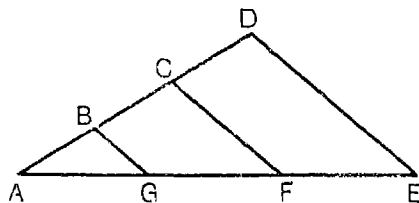



FIG 12

The rectangle and square.—The pupils should be taught what a rectangle is and what a square is, not from definitions of these figures, but from rectangles and squares cut out in cardboard or stiff paper, or forming the surfaces of solids Walls, doors, etc , can also be used in explanation.

The pupils can recognise the figures without having any clear knowledge of their properties; that is, they can divide given figures into the two classes, rectangles and non-rectangles, squares and non-squares.

If a number of figures are shown, e g. irregular quadrilaterals, rectangles, parallelograms, circles, etc , the children should be able to group them according to their type.

It is good training to have the children state in their own words the differences between the figures. The teacher, however, should be prepared to accept statements not strictly mathematical. "A rectangle is different from a square because it is longer than it is broad"; and "This figure (a parallelogram) is not a rectangle because its corners are different," are two examples which, for the child in the primary school, are quite satisfactory Statements about "the equality of adjacent sides" or "the angles being right" would probably lead to confusion At the very least they would necessitate long explanations hardly in keeping with a course for the primary school.

The words side, vertex (plural, vertices) and diagonal should be explained, so that the children can use them correctly.

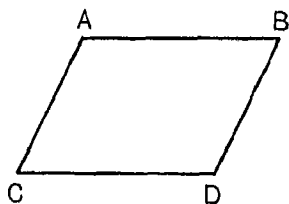



FIG. 13

Care should be taken to show the pupils how to name the figures, the letters being taken in order round the figure, e g. ACDB or ABDC, *not* ABCD.

The teacher can test the pupils' ideas of the shape of a rectangle and of a square by setting the following two examples,—to be taken on squared paper.

(i) Draw a rectangle of any size. Measure the lengths of the sides.
(ii.) Draw a square of any size Measure the lengths of the sides

It will probably be found that the equality of opposite sides of a rectangle and the equality of the sides of a square are practically taken for granted by the class

The following two constructions may then be made.

On squared paper draw (i) a rectangle 3 in. long and 2 in. broad; (ii) a square with side 3 in.

The pupils should be able to state the construction step by step as they do it

EXERCISES

1. Draw a straight line AB=4 in. Draw AD perpendicular to AB and 3 in. in length. Through D draw DX parallel to AB and through B draw BY parallel to AD. Let DX, BY cut in C. What is ABCD? Measure the diagonals AC and DB.
2. Draw two or three rectangles of various sizes. What would you say about the lengths of the diagonals? Measure the diagonals and show that they are equal.
3. Draw a rectangle ABCD. Let AC and BD cut in O. Measure OA, OB, OC, OD What can you say about these lines?
4. Draw a square. Measure its diagonals. Use your ruler and set square to show that they are perpendicular to each other.

Scale drawing.—The need for scale drawing should be explained to the children The object is usually too large to be drawn the actual size,—e.g. a field; though in some cases a "life size" drawing would be of little use,—e g. the parts of a small flower

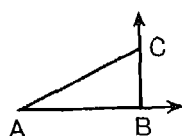
Children are accustomed to see scale drawings in their picture books,—houses, animals, etc.—and their early drawings are naturally smaller than the object drawn.

In scale drawing the same distance is always represented by the same length, and vice versa

Before making a scale drawing, it is advisable to sketch a rough diagram showing the measurements of the object

Note the following examples·

(i.) Measure the length and breadth of a door and draw it to scale
Suppose the door is 6 ft. 6 in by 3 ft 6 in
Choose the scale,—keeping in mind that the accuracy of the diagram is increased by increasing the scale
To begin with, the detail of the work should be shown
Scale: 1 inch represents 1 foot.
Distance representing 6 ft. 6 in = 6·5 in
Distance representing 3 ft 6 in = 3·5 in.
By questioning develop the following construction —Draw a horizontal line, measure a distance AB=3·5 in along it; through A, B draw perpendiculars to AB, and cut off AC, BD equal to 6·5 in, join CD. ABDC represents the door on the given scale

(ii) A boy set out for a walk He walked 2 miles east, and then turned 1 mile north How far was he from his starting point?
For class-work 2 inches to the mile would probably be the best scale

Rough Diagram
FIG. 14A

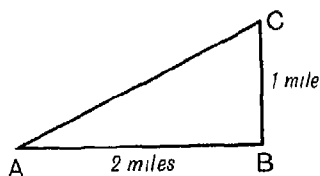



FIG 14B

Some oral work is probably necessary here to make sure that BC is perpendicular to AB AB=4 in, BC=2 in
By measurement AC=4 5 in
∴ Distance required=2·25 miles or $2\frac{1}{4}$ miles.

(iii) A boy walked 2 miles north, $\frac{1}{2}$ mile east, 1 mile south, and 1 mile west. How far was he from his starting point?
Scale: 1 inch to the mile

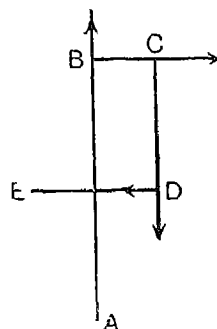



FIG 15A

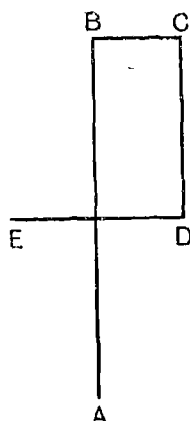



FIG 15B

Again oral questioning will make the meaning of the diagram clear, and show that there are two pairs

of parallel lines perpendicular to each other

By measurement AE = 1·12 in.

∴ Distance required = 1·12 mile or $1\frac{1}{8}$ mile, approx.

EXERCISES

1. Draw a plan of the classroom, showing the doorway, the fireplace (if any), and the table or desk. Compare with the drawings of other pupils. Notice that the drawings have the same shape, though perhaps not the same size.
2. Draw a plan of a room 24 ft. by 18 ft. Find the distance between opposite corners. [30 ft.]
3. A man walked 3 miles west and then 2 miles south. How far was he from his starting point? [3·61 miles.]
4. Draw a diagram representing the following walk:—2 miles east, 3 miles south, 4 miles west, 2 miles north. How far is the walker from the starting point? [2·24 miles.]
5. A wall is 36 ft. long and 8 ft. high. Draw a diagram of the wall on the scale $\frac{1}{10}$ inch to a foot. What is the distance of the top of one end from the bottom of the other? [36·9 ft.]
6. A rope runs from the top of a flagstaff 24 ft. high to a point on the ground 10 ft. from the foot of the flagstaff. Find its length. [26 ft.]

Shape and size of rectangles and squares.—With two squares in front of them, either cut from cardboard or drawn on the blackboard, the pupils can easily answer these questions:—

(i.) What can be said about the shape of the two squares?

(ii.) Does the shape being the same cause the size to be the same?

The pupils can recognise that two figures may have the same shape without having the same size.

Again there is no need to worry young pupils with the exact meaning of figures having the same shape, i.e. with the mathematical conditions for similarity.

Two rectangles can be taken with the same length and breadth, i.e. congruent rectangles.

Are these rectangles (i) of the same shape, (ii) of the same size?

The same procedure may be gone through with two other rectangles, one 4 in. by 2 in., and one 2 in. by 1 in. They may be taken larger, of course, if they are cut from cardboard.

Lastly, two rectangles are constructed, one 4 in. long and 1·2 in. broad, and one 3 in. long and 1·6 in. broad. Pupils see they are of different shape, but cannot say which is the larger. [If exception is taken to the use of decimals, the rectangles may be taken 4 in. by $1\frac{1}{2}$ in., and 3 in. by 2 in.]

This leads on to the method of measuring the size of a rectangle.

The unit of area.—In the same way as a length is measured in miles or yards or inches, or as a sum of money is measured in pounds or shillings or pence, the size of a rectangle or square in particular, and of a surface in general, must be measured in terms of some unit.

The unit used is the unit square. The teacher can show the class how the unit of area is obtained from the unit of length, i.e. how the square inch is obtained from the inch, etc.

The pupils can then draw on thick paper and cut out an inch square. Only a ruler and a set square need be used. The teacher should watch that the sides of the square are made equal. A word of advice at the beginning would probably prevent any trouble, but it is doubtful if it would be ultimately helpful to the class.

This construction may be repeated with squared paper. The two squares may then be compared, the method of placing one on top of the other probably being suggested by the class. There is no need to mention superposition or congruent figures.

The class should consider fractions of a square inch and recognise that, as each square inch contains 100 small squares, each small square is $\frac{1}{100}$ or ·01 of a square inch

Examples of such fractions are given below

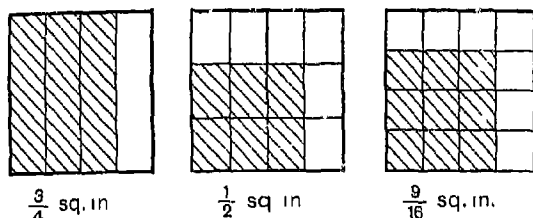



FIG 16A

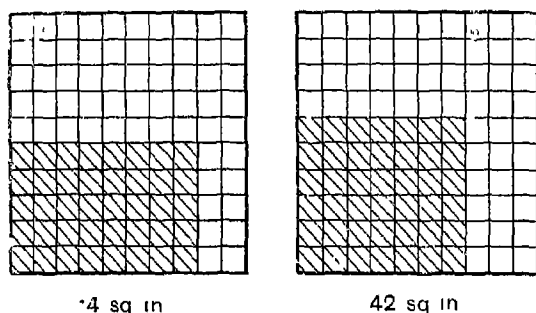



FIG 16B.

Area of a rectangle or square.—Let the pupils draw rectangles of various sizes, (i) 4 in. by 3 in., (ii) 3 in by 2 in, (iii) 5 in. by 2 in, complications being avoided by keeping the measures integral

Let them find how many times the unit square is contained in the rectangle The size of the rectangle can thus be expressed in square inches

The meaning of the word area can be explained as the amount of surface covered by the rectangle

The pupils can see the reason for the usual rule for finding the area of a rectangle by tabulating the results obtained

Hence the usual rule —

Area=length×breadth, or A=L×B

Even at this stage pupils should be shown that the formula given really means that the number of square inches in the area is the product of the numbers of inches in the length and breadth.

The method may be extended to the case in which the measures of the length and breadth are fractional

Draw on squared paper rectangles with the following dimensions —

(i) 3 5 in by 2·5 in ;
(ii) 2·8 in. by 1·7 in ;
(iii) $2\frac{1}{4}$ in. by $1\frac{3}{4}$ in ,
(iv) $3\frac{1}{4}$ in. by $2\frac{3}{4}$ in

The areas can be found by adding the fractions of square inches contained in the rectangle.

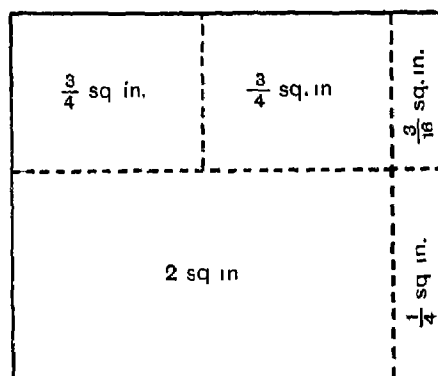



FIG 17A

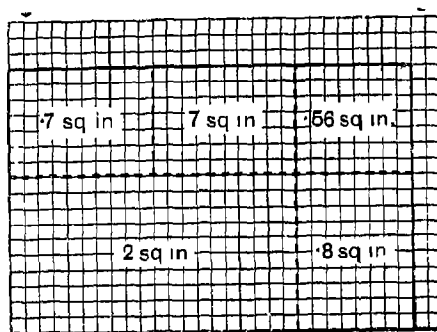



FIG 17B

Rectangle	Number of inches in length (L)	Number of inches in breadth (B)	Product of these numbers (L × B)	Number of sq in. in area
(i)				
(ii)				
(iii)				

The results may be tabulated as in the simpler cases.

There is no additional difficulty in finding the area of a square, this figure being only a particular case of the rectangle. It may be useful, however, to find the areas in one or two cases, using squared paper and tabulating the results as in the case of the rectangle.

Find the areas of squares of 2 in., $2\frac{1}{2}$ in , 3·4 in side

Square	Number of in. in side of sq. (L)	Number of sq. in in area (A)	L×L
(i)			
(ii)			
(iii)			

The symbol 3^2 (3 squared) can be explained here, if thought advisable, and the formula stated:—

$$\text{area} = (\text{length})^2,$$
$$\text{or } A = L^2$$

The pupils can then recognise how the table of square measurement is built up from the table of linear measurement.

The length of a rectangle of given area and breadth.—Before the usual rule is taken the children should recognise from numerical examples that the problem is merely one of finding the remaining factor, given the product and one factor

Then follow the general rules —

$$\text{length of rectangle} = \frac{\text{area}}{\text{breadth}},$$

$$\text{breadth of rectangle} = \frac{\text{area}}{\text{length}}$$

EXERCISES

1. Find the areas of the following rectangles and complete the table

Rectangle	Length	Breadth	Area
(i)	6 ft.	5 ft.	
(ii)	5 in.	4 in	
(iii)	8 yd.	5 yd.	
(iv)	$3\frac{1}{2}$ in.	$2\frac{1}{2}$ in.	
(v)	5 ft. 4 in.	2 ft 3 in	
(vi)	4 2 cm	2·2 cm	

2. Find the areas of squares with the following sides —5 yd., 7 in ; 4 ft ; $2\frac{1}{2}$ in , 3·2 cm
3. A rectangle has an area of 48 sq ft If its length is 8 ft., what is its breadth? What is the length of a rectangle of the same area whose breadth is 4 ft.?
4. A rectangle has an area of $1\frac{2}{3}$ sq ft. and a length of 1 ft. 4 in. What is its breadth?
5. Make the necessary measurements with the given rectangular block and find the total surface area of the solid
6. Make any necessary measurements with the given cube and find the total surface area.

The parallelogram.—The nature of the parallelogram should be explained to the class The definition of the figure is an easy one, and could possibly be grasped by primary pupils

Let the pupils draw two pairs of parallel lines enclosing a parallelogram

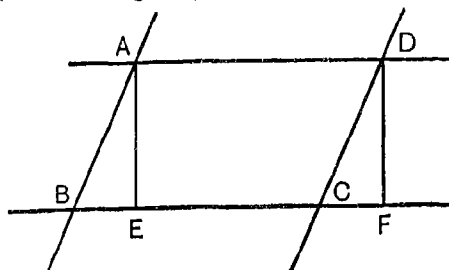



FIG 18

Measure the sides and tabulate the results as follows —

AB = } AD = }
DC = } BC = }

Repeat these measurements in the case of two or three other parallelograms From the measurements the pupils deduce the equality of the opposite sides of a parallelogram

AE, DF are perpendicular to BC. It is obvious that AE=DF. This can be verified by measurement.

AE or DF gives the *height* of the parallelogram, usually called the *altitude* BC is called the *base*

Give the usual contraction for parallelogram·— $||^m$ or parm

The area of a parallelogram.

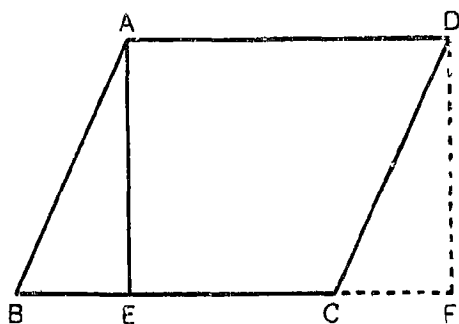



FIG. 19

Draw a parallelogram on cardboard as in the diagram Cut it out with a sharp knife.

Cut off triangle ABE and place it with AB along DC. What is the shape of the figure obtained? How would the area of this figure be found? What is true about the lengths of EF and BC?

Hence we get the following facts —

Area of parm. ABCD = area of rect AEFD
= EF×EA (or AD×EA)
= BC×EA.
i e. area of parm. = base×altitude

The rule may be verified by drawing two or three parallelograms on squared paper and finding their areas by "counting the squares" The area may be found roughly by counting as a whole square any fraction greater than ½, and neglecting any fraction less than ½ The results can be tabulated as in the case of the rectangle.

	Number of in in base (B)	Number of in in altitude (H)	Number of sq in in area	B×H
(i)				
(ii)				

EXERCISES

1. Find the areas of the following parallelograms and complete the table.

Parallelogram	Base	Altitude or height	Area
(i)	8 ft.	5 ft.	
(ii)	7 in.	4 in.	
(iii)	6 cm	8 cm.	
(iv)	4½ yd	3½ yd	
(v)	2 ft 8 in	2 ft 6 in	
(vi)	5·5 cm	3·2 cm.	

2. On squared paper draw two parallelograms as shown in the diagram By

counting the squares in each, show that the parallelograms are equal in area.

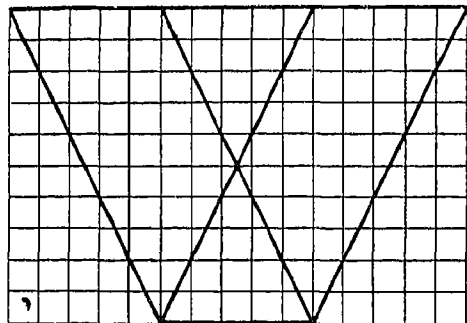



FIG 20

3. Cut out a parallelogram. Cut along one of the diagonals and show that you can place the two parts one on top of the other.

The triangle.—A triangle is a figure enclosed by three straight lines

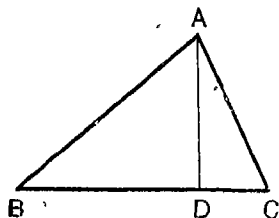



FIG. 21.

The triangle is named ABC, and is generally written △ABC. The points A, B, C are called the *vertices* of the triangle, the lines AB, BC, CA the *sides*.

If AD is drawn perpendicular to BC, AD is called the *height* or *altitude* of the triangle, and BC the *base*. The triangle has, of course, three bases and three corresponding heights.

The area of a triangle.—

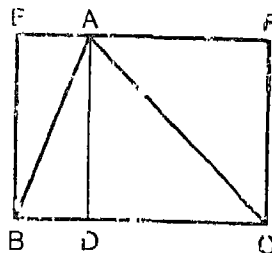



FIG. 22.

Draw △ABC on thin cardboard, or on squared paper. Draw rect. EBCF as in the diagram.

Cut out rect. EBCF, and cut half through along AB, AC

Fold back △s ABE and ACF. They are found exactly to cover △ABC.

What fraction is △ABC of rect. EBCF?

As in the case of the parallelogram DA = BE

Hence the usual rule.—

Area of △ABC $= \frac{1}{2}$ area of rect EBCF
$= \frac{1}{2}$ BC×BE
$= \frac{1}{2}$ BC×DA;

or, area of a triangle $= \frac{1}{2}$ base×altitude.

The rule can also be verified by "counting the squares" in the △ABC and showing that it is half the number in the rect. EBCF.

EXERCISES

1. Find the areas of the following triangles and complete the table

Triangle	Base	Altitude or height	Area
(i)	6 in.	4 in.	
(ii)	5 yd.	6 yd	
(iii)	8 cm	7 cm	
(iv)	4½ in	3½ in	
(v)	1 ft 6 in	10 in.	
(vi)	3 6 cm	2 5 cm.	

2. Draw a parallelogram and a triangle as in the diagram Find the areas of the two figures by counting the squares. How many times does the area of the first contain the area of the second?

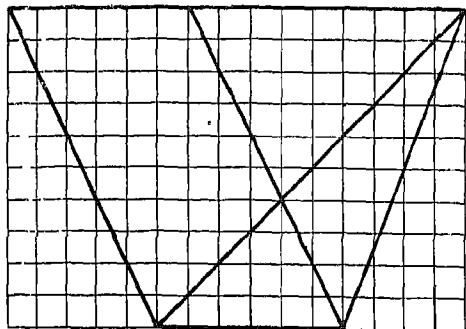



FIG. 23

3. Draw two triangles as in the diagram. AD || BC. Find the areas of the triangles by "counting the squares" What can you say about these areas?

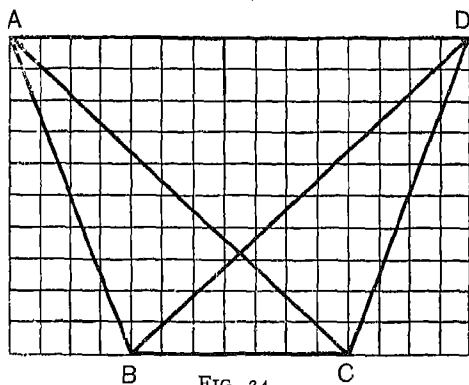



FIG 24

4. In the given triangular pyramid measure the base and the altitude of each triangular face. Find the total surface area of the solid
5. Make the necessary measurements to find the total surface area of the given square pyramid

The measurement of volume.—Following a procedure similar to that in the case of area, the pupils may be shown the need for a unit of volume

Two cubes are generally recognised as having the same shape; the difference in "size" too is generally obvious

Pupils readily recognise the difference in shape of cones and pyramids, etc., and even of two square pyramids if they do not too closely approach similarity They do not find it easy to recognise difference in "size" if the solids are of different shapes. The size is often connected in the child's mind with length, and it is sometimes difficult to get him to understand that the breadth and thickness must also be considered

The bulk of two solids may be compared by the amount of water displaced by them,—whether from a eureka can, a jug, or a pail does not matter.

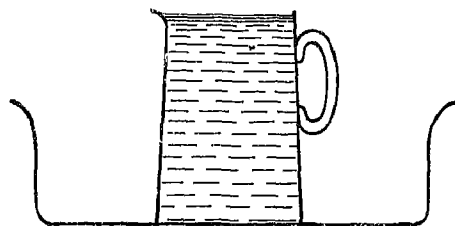



FIG 25

Fill the jug completely with water Slowly immerse one of the two bodies. Catch the displaced water in a basin and pour it into a vessel Repeat this with the second body and put the displaced water in a similar vessel It is generally obvious which body has displaced more water.

This makes clearer the idea of the size or bulk of a body,—the amount of water it can displace, the amount of space it takes up

The size or bulk of a body is usually called its *volume.*

A definition of volume at this stage is probably inadvisable

Again, as in length, area, weight, etc, the volume of a body is measured by the number of times it contains some definite volume, called the unit volume.

The formation of this unit volume is shown to the class,—the volume of a cube with edge equal to the unit of length

The class can construct this unit from thick paper (squared, for simplicity) or from thin cardboard

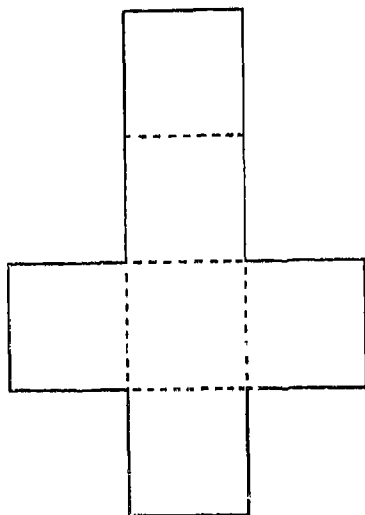



FIG 26

The diagram shown is drawn, cut along the outer lines, and half way through along the dotted lines The "net" may then be folded to form the cube, the edges being secured with gummed paper or cloth This unit volume is called a cubic inch.

The volume of a rectangular block.—Using the cubic inches made in the class, or others, construct a rectangular solid as follows

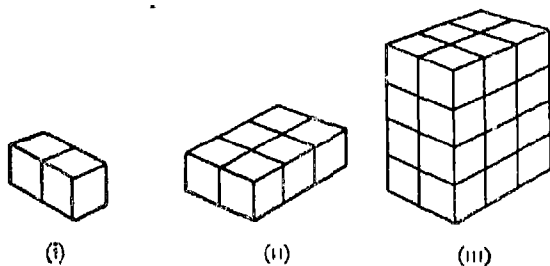



FIG 27.

Place two cubic inches together as in (i).

Form three such pairs and place them together as in (ii). How many cubic inches are in the second solid? How is that number obtained from the 2 and the 3?

Form four solids like that in (ii) and place them one above the other to form the solid in (iii).

How many cubic inches are in the completed solid? How is that number obtained?

The second solid is 3 times 2 cub. in. or 6 cub. in. The third is 4 times 6 cub in.

Other rectangular solids may be dealt with, the results tabulated, and the usual rule proved.

Rectangular solid	Number of in in length (l)	Number of in in breadth (b)	Number of in in height (h)	Number of cubic in in volume	l×b×h
(i)					
(ii)					
(iii)					

The rule is usually stated:—

vol. of rect. block = length × breadth × height.

As in the case of the area of a rectangle, the pupils should be warned that this means the number of cubic inches in the volume equals the product of the numbers of inches in the length, breadth and height of the solid

There are too many difficulties in proving the rule with fractional measures of length, breadth, and height The rule should be assumed to hold generally.

The derived formulae may also be taken with the class.—

$$\text{length} = \frac{\text{volume}}{\text{breadth} \times \text{height}}, \text{ etc.}$$

The cube may be considered as a particular case of the rectangular solid; or the rule for finding the volume may be found by building up cubes of 2 in edge, 3 in. edge, as in the previous case.

The symbol 2^3, etc. may be explained, if thought advisable, and the rule for finding the volume of a cube stated in the form:—

$$\text{volume} = (\text{edge})^3,$$
$$\text{or } V = L^3.$$

It is probably inadvisable to deal with the volume of any other solid with children in the primary school.

If it is desired, however, it is always possible to find the volume of a solid by measuring the volume of displaced water, and showing that this volume is obtained, at least approximately, by using the corresponding formula for the solid.

Exercises

1. Find the volumes of the following rectangular blocks and complete the table.

Block	Length	Breadth	Height	Volume
(i)	9 ft	7 ft	5 ft	
(ii)	12 in	8 in	6 in.	
(iii)	6 cm	5 cm	4 cm	
(iv)	$7\frac{1}{2}$ in	5 in	$3\frac{1}{2}$ in	
(v)	6 5 cm	3 2 cm	2 4 cm	
(vi)	2 ft	1 ft 4 in	1 ft 3 in	

2. Find the volumes of cubes with edges 5 ft, 9 in, 7 cm, $3\frac{1}{2}$ ft, 2·5 cm.

The use of the compasses.—The use of the compass (or compasses) is of interest to young children In their games it is sometimes necessary to draw a circle, and this is frequently done by keeping the feet in a fixed spot and drawing a circle with outstretched arm. They seem to recognise that a fixed centre and radius are required

The first attempts at circle drawing are usually disappointing The teacher should give some hints to his pupils on how to use the instrument, e g.,

(i) Keep the fingers off the "legs" of the compasses.
(ii) Do not lean heavily, and especially avoid pressing on the pencil leg
(iii) Let the compasses lean slightly in the direction in which the pencil is moving
(iv) Always describe the circle in the clockwise direction.

Explain the meanings of the centre, circumference, radius, diameter,—without attempting definitions

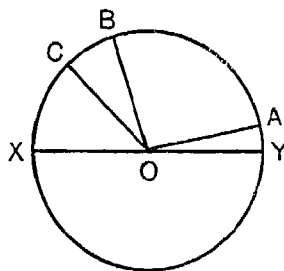



FIG 28

With the diagram above pupils should be able to answer such questions as these —

(i) If OA = 5 in., what is the length of OB, OC, XY?
(ii.) Where would a point lie which is 5 in from O?
(iii) If XY = 6 in., what is the length of OX, OA?

The word *arc* is handy in stating constructions and might also be taken

The pupils can verify that a circle is divided into two equal parts by a diameter, and can be divided into four equal parts by two perpendicular diameters,—

(i) by cutting out a circle and folding it so that the two parts coincide; and again folding one part of the folded edge over the other part;
(ii) by folding a piece of paper twice (so as to obtain four right angles),

drawing a "quadrant" of a circle with its centre at the corner with the two folded edges, cutting along the curve and opening out.

The word *semi-circle* can be taken at this point

Pupils should see that a circle is fixed in size and position when its centre and radius are known. Hence we have the usual instruction for drawing a circle,—"With centre A and radius R draw a circle"

EXERCISES

1. With centre A draw circles with radii 1 in., 2 in., 3 in.
2. Draw a straight line AB 3 in. long. With centre A and radius 2 in draw a circle; with centre B and radius 3 in. draw a circle The two circles cut in C and D Measure CD [3·77 in]
3. Draw a circle with two perpendicular diameters Join the ends of the diameters. What is the figure you obtain? How would you show this?

A CD B

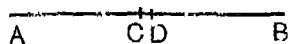



FIG 29

4. Draw a straight line AB. Divide it at C so that AC=CB as nearly as you can judge. With the compasses cut off BD=AC. How would you find the point bisecting AB,—i.e. dividing it into two equal parts
5. Draw a straight line XY 3 in. long With centres X and Y draw circles of radii 2 in., cutting each other in P above XY and Q below XY. Join PQ, and let PQ cut XY in A. Measure XA and YA. Show that XY is bisected at A.
6. Draw straight lines 2·5 in and 3·5 in long, and bisect them, using two different methods
7. Draw a straight line 3 in. long Divide it into two equal parts How would you divide it into four equal parts?

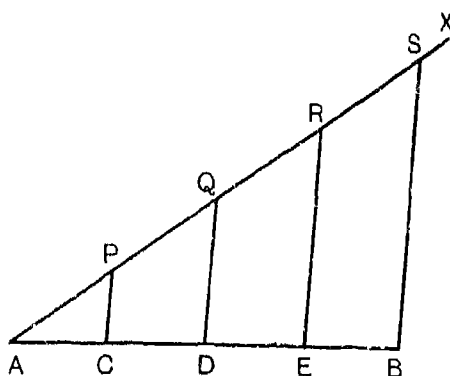



FIG 30

8. Draw the figure shown AB=3 in. AP=PQ=QR=RS. BS, ER, DQ, CP are parallel By measurement show that AC=CD=DE=EB
9. Draw a straight line AB 4 in. long and divide it into five equal parts
10. Draw the diagrams shown.

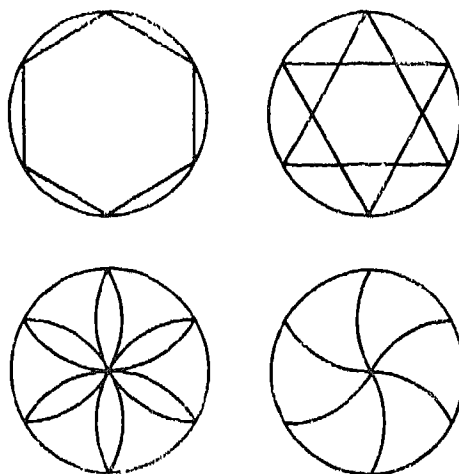



FIG 31.

The method of drawing will probably require explanation

Point out that the radius of a circle can be stepped off six times along the circumference.

The use of compasses for measuring lengths.—The teacher should explain care-

fully how the legs of the compasses can be arranged with a given distance between them,—the point being placed at O on the ruler and the pencil opened to the required distance. It should be remembered that the legs spring back a little when the pressure is released. A little experience with any pair of compasses will show how much allowance to make for this.

The pupils should then be taught how to carry a distance on the compasses and cut off that distance from a given straight line

The following simple construction gives the length of an oblique line on squared paper without the use of a ruler.

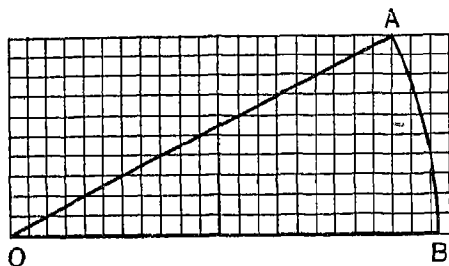



FIG 32

The length of (the line) OA can be found from the equal line OB drawn in the horizontal or vertical direction.

Note the following examples:—

(i) A man sets out from a town A and walks east to B, a distance of 2 miles. He then turns north and walks to C, a distance of 3 miles. How far is he from his starting point?

The diagram gives a drawing of the walk on the scale of $\frac{1}{2}$ in to the mile

Man's distance from starting point

$$=AC=AD$$

$$=3\cdot6 \text{ miles}$$

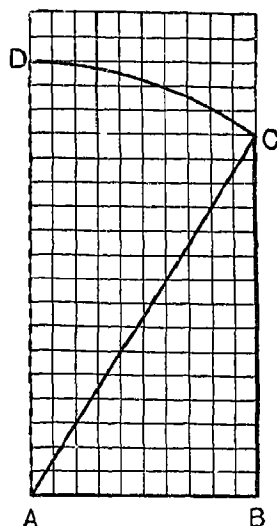



FIG 33

(ii) Take two points A and B, $2\frac{1}{2}$ in. apart Draw a circle with centre A and radius 2 in, and a circle with centre B and radius $1\frac{1}{2}$ in. In how many points do the circles cut? How far are these points from A and from B?

(iii) Consider the problem:—
A house H is 2 miles from a town A and $2\frac{1}{2}$ miles from B If A and B are 3 miles apart, how would you find the position of H?

The construction should be developed by the class and carried out step by step as it is suggested.

(*a*) What points are fixed first of all, and how?
(*b*) Where do all points lie which are 2 miles from A?
(*c*) Where do all points lie which are $2\frac{1}{2}$ miles from B?
(*d*) What points are 2 miles from A and $2\frac{1}{2}$ miles from B?
(*e*) Where is H?

The statement of the construction should be taken carefully with the pupils They

have something definite to say and should be encouraged to say it clearly and concisely.

EXERCISES

Repeat the examples on scale drawing Nos. 2 to 6, without the use of a measuring scale.

Measurement of curved lines.—The only curved line of any importance to young pupils is the circle Before finding the usual relation between the circumference and the diameter of a circle the pupils may measure given curved lines These are preferably cyclostyled, so that the same length is being measured by each pupil.

The method recommended is to use a thread. A knot is tied at one end of the thread. The knot is placed at one end of the line, and the thread laid along the line, being kept taut without being stretched An ink mark is made at the point of the thread above the other extremity of the line. The length of the line is the distance between the knot and the ink mark.

The results of the various members of the class may be compared

Relation between the circumference and diameter of a circle.—The circumference of a circle,—a coin or a disc,—may be found as follows A point is marked on the circumference This point is placed at a known point on a scale, and the coin rolled along the scale without slipping. The reading is noted where the marked point again touches the scale. The circumference can thus be found.

The measurement can also be made by wrapping a strip of paper round the circular disc, and pricking through the overlapping part with a pin. The distance between the two pinholes gives the circumference of the circle.

The diameter of the circle may be found by direct measurement of the "broadest part" of the circle, or by placing it between two set squares and taking the measurement as shown in the diagram.

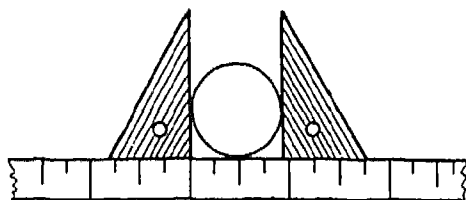



FIG 34

From these results the pupils can find the number of times the circumference contains the diameter. The results may be tabulated as follows.—

Circle	Circumference	Diameter	Circumference / Diameter
(1)			
(11)			
(iii)			

Other results may be obtained by drawing circles with diameters 2 in , 3 in., 4 in., and measuring their circumferences with thread. The relation between the circumference and diameter in these cases can be more easily calculated.

If the class cannot find the result as above, it may be taken as follows:—

Circle	Diameter	Circumference	Diameter×3	Diameter × $3\frac{1}{4}$
(1)				
(ii)				

If the work is fairly accurate the pupils can recognise that the circumference contains the diameter more than three times, but less than $3\frac{1}{4}$ times,—almost half way between in fact.

The true value of the fraction must be given them.

Hence, irrespective of the size of the circle,

circumference = diameter × $3\frac{1}{7}$ (very nearly).

Put into words —

(i.) The circumference of any circle is obtained by multiplying the diameter by $3\frac{1}{7}$

(ii.) The diameter of a circle can be obtained by dividing the circumference by $3\frac{1}{7}$

EXERCISES

1. Find the circumferences of circles whose diameters are (i) 14 ft ; (ii) 35 in , (iii) 2 ft 4 in , (iv) $5\frac{1}{4}$ in , (v) 10·5 cm
2. Find the radii of circles whose circumferences are (i) 44 yd , (ii) 11 in ; (iii) 2 ft. 9 in , (iv) 13 2 cm.

The area of a circle.—Draw on squared paper a number of circles of different radii,—e g 2 in , 2 5 in , 3 in The area of the circles may be found by "counting the squares" in a quarter of the circle,—neglecting anything less than $\frac{1}{2}$ small square, and counting as one small square any fraction greater than $\frac{1}{2}$ Find how many small squares are contained in the area of each circle, and how many in the area of the square on the radius These areas may, if desired, be expressed in square inches

Find the number of times the area of the circle contains the area of the square on the radius

The results may be arranged as in the case of the previous section

Circle	Area of quarter circle	Area of circle	Area of square on radius	Area of circle / Area of square on radius
(i)				
(ii)				
(iii)				

The second method may also be used to work out the results.

The result is obtained —

Area of circle = area of square on radius × $3\frac{1}{7}$ (very nearly).

The relation may be stated in words as in the corresponding relation between the circumference and diameter

Examples—Find the areas of the circles given in the previous set of examples.

The angle.—Start off with two "lines" which can rotate about a point A pair of dividers or compasses do very well, or two narrow strips of wood fixed together at one end with a screw

One "leg" or strip of wood starting from the other is said to turn through an *angle*,—a small amount of turning giving a small angle, and a large amount a large angle

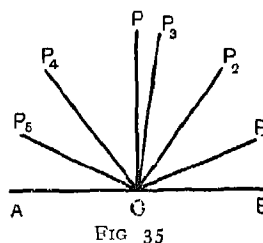
The class can be shown a small angle increasing until the legs are perpendicular to each other, and then till the legs are in the same straight line

There is no need at this stage to consider reflex angles.

The amount of turning, of course, is only the measure of the angle, pupils can hardly avoid considering the amount of turning as the angle,—and there seems no real objection to this.

The need of a unit for measuring an angle should be pointed out,—just as there is need of a unit for measuring length or area The right angle is taken as the unit.

Meaning of the right angle.—Start off with two straight lines, represented say by two rulers.

FIG 35

In the initial position let one ruler lie along OB

Let the ruler rotate about O into the successive positions OP_1, OP_2, etc.

In various positions see if the class can answer the question:—Which is greater, the left hand angle or the right?

In the one position OP the pupils cannot say which is greater

When the two angles are equal the angles are called right angles.

Notice also that the two straight lines AB and OP are perpendicular to each other.

Naming an angle.—In the angle of the diagram X is called the *vertex*, XY and XZ the *arms* of the angle.

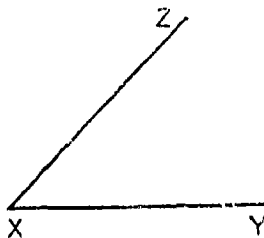



FIG 36

The angle may be named (i) using three letters, as YXZ or ZXY, the letter at the vertex coming between the other two; (ii) using one letter, where there is no ambiguity,—the angle X.

Pupils may use any of the contractions, ∟YXZ, $Y\hat{X}Z$, ∠YXZ

They should also be taught to recognise an *acute* angle and an *obtuse* angle.

EXERCISES

1. Show how to fold a piece of paper to get two creases forming four right angles.

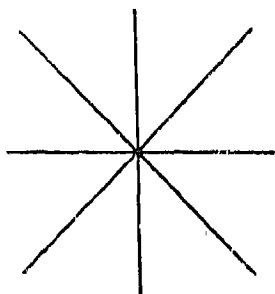



FIG. 37.

2. Draw an angle AOB and cut it out along OA and OB. Fold the paper so that OB lies exactly along OA. Let OX be the crease What must be true about the angles AOX and BOX?
3. Use the diagram of Ex. 1 to show the conventional directions of N., S , E , W.
4. Refold the paper of Ex 3 and fold again so as to obtain the diagram Fig. 37. What can be said about the sizes of the acute angles in the figure?

(The diagram may, if desired, be used to explain the terms N E., N.W., S E , S.W)

The protractor.—A class can readily understand that the right angle is an awkward unit for measuring an angle, a fraction would be practically always involved In the same way as the pound for convenience is divided into smaller units,—the shilling and the penny,—and the yard into feet and inches, so the right angle is divided into 90 smaller units called degrees.

The contraction for degrees should be given,—60° for 60 degrees.

The protractor is used to measure an angle just as a ruler is used to measure a length

Only a short explanation need be given of the construction of the protractor,—that it is the following figure with parts of the lines shown omitted, and the intermediate lines inserted

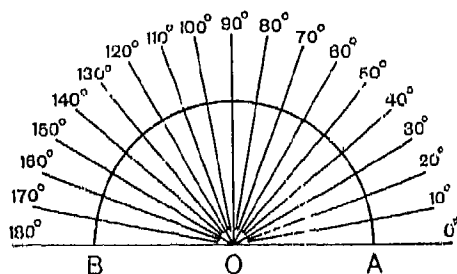



FIG. 38

Great care should be taken in teaching the use of the protractor The mid point of the base,—shown by an arrow, a line, or a dot,—should be *exactly* on the vertex,

and the base along one arm The size of the angle in degrees is given by the reading of the other arm

The reason for the double scale should be explained,—the scale to be used depending on whether one arm of the angle lies along OA or OB.

The two common mistakes are :—

(i.) giving the supplement of the required angle,—i e 47° for 133°,
(ii.) giving the size of an angle as e.g 153° when its actual size is 147°. A glance at the protractor will explain the error.

Practice should be given here in the measurement of angles.

It is useful to have duplicated copies of the angles being measured, so that all the pupils are measuring the same angles.

Measurements should also be made of the angles in the faces of some of the solids,—cubes, prisms, and pyramids

The class may be puzzled by an angle with arms too short to give a reading on the scale. By rotating a short line and a long line together it can be shown that the amount of rotation, i.e. the size of the angle, does not depend on the length of the arms, and that therefore the arms can be produced to allow a measurement to be made.

In the same way, to construct an angle of 50° with one arm along OA, the protractor is placed with the base along OA, and the mid-point of the base at O. A point, B, is marked at 50 on the scale, OB is joined, and produced if necessary.

The class may now pass on to exercises combining the measurement of straight lines and of angles.

Exercises

1. A wheel has 10 spokes. What is the angle between any two spokes?
2. Through what angle does the minute hand of a clock turn in 10 minutes? How long would it take to turn through 150°?
3. Through what angle does the hour hand of a clock turn in 20 minutes? How long would it take to turn through 120°?
4. Measure the angles of your set square (i) by direct measurement; (ii) by making a copy of it and measuring the angles obtained. (How would you avoid having "rounded" vertices?)
5. Make two right angles using the protractor Cut them out and, by placing one on top of the other, prove that they are equal.
6. Draw an angle XAY equal to 50° with AX=3 in and AY=4 in. Measure XY and the angles at X and Y. [3·09 in, 82·0°, 48·0°]
7. Draw an angle POQ equal to 40°, with OP=OQ=2½ in. Measure PQ and the angles at P and Q [1·71 in, 70°, 70°]
8. Draw AB parallel to XY and AC parallel to XZ What seems true about the two angles BAC and YXZ? Measure the angles.
9. Take a straight line AB with a point C in it (about half way between A and B) With centre C and a suitable radius draw a circle cutting CA and CB in D and E. With centres D and E and equal radii draw circles cutting in P above the line AB. Join PC. Use your set square to show that PC is perpendicular to AB. Also measure the ∠s PCB, PCA with your protractor. Is it necessary to draw the whole circles in the above construction?
10. Draw a straight line XY and take a point A above it. With centre A and a suitable radius draw an arc of a circle to cut XY in P and Q. With centres P, Q and equal radii draw two arcs cutting below the line in B. Join AB cutting XY in C As in No 3 show that AC ⊥ XY
11. Draw an angle XOY of 60°. With centre O and any suitable radius draw an arc cutting OX, OY in P and Q With centres P and Q and equal radii

draw arcs cutting in A Join OA Measure ∠s AOX, AOY.
Repeat the same construction with other angles and note that OA divides the angle into equal angles,—i e *bisects* the angle.

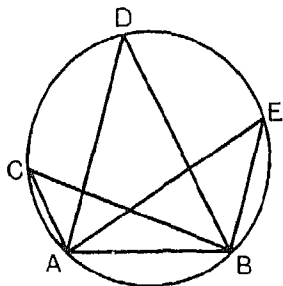



FIG 39

12. Draw the diagram shown Measure the ∠s ACB, ADB, AEB. Repeat with other circles

13. Draw a circle with diameter AB Take C a point on the circle and join CA, CB Measure ∠ ACB. Take other points D, E on the circle and measure ∠s ADB, AEB.

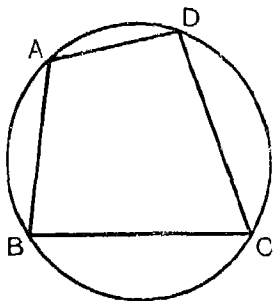



FIG. 40.

14. Draw the diagram Fig. 40 Measure the ∠s A, B, C, D What is the sum (i) of A and C; (ii) of B and D?

Simple cases of the construction of triangles.—It is often necessary to construct a triangle satisfying given conditions. The easier cases of such constructions do not cause much difficulty to young pupils

It should be remembered that a rough diagram with the given sides and angles marked often suggests a construction.

The construction should be developed with the class, the pupils carrying out each step as it is suggested.

Examples.—

(i) Draw △ABC, having AB=4 in., BC=3 in., and ∠B=50°. Measure AC, ∠A and ∠C.
The rough diagram is put on the blackboard The questioning takes some such form as this

(*a*) What shall we draw first?—a vague question, perhaps, but one which usually gets a sensible enough answer. [Draw BC=3 in., or draw AB]

(*b*) What is the next construction? [At B make ∠CBX=50°]

(*c*) What is required to complete the construction? [From BX cut off BA=4 in and join AC]

(*d*) Could we construct by drawing the angle first? Yes [This first involves fixing the direction of one side] What should we do after drawing the angle?

The statements as given by the class will require a little polishing, but it is worth while to try to obtain a clear set of instructions

The measurements are stated in some such form as this:—

By measurement,

AC=3·1 in.; ∠A=48°, ∠C=82°.

(ii.) Draw △PQR, having PQ=3 in., ∠P=40°, ∠Q=65° Measure RP and RQ. [2·82 in., 2·00 in.]
Develop as in Ex. 1. PQ is drawn first R must lie on a line making an angle of 40° with PQ and also on a line making an angle of 65° with QP.

(iii) Draw $\triangle XYZ$ having $XY = 2{\cdot}5$ in., $YZ = 3$ in., $ZX = 3{\cdot}5$ in. Measure the angles at X, Y, Z [44·5°, 57°, 78·5°.]
First draw YZ (say). X must be at a distance of 2·5 in. from Y and also at a distance of 3·5 in. from Z. It is therefore the point of intersection of two circles, with centres Y and Z and radii 2·5 in. and 3·5 in.

(iv) Draw $\triangle LMN$, right angled at M with $LM = 2$ in. and $LN = 3$ in. Measure MN and the angle at L. [2·24 in., 48·2°.]
LM is drawn first and then MX perpendicular to LM. N lies on MX and is 3 in. from L. Hence find the point of intersection with MX of a circle, centre L and radius 3 in.

Young pupils often find it easier to consider the triangle when it is cut out of paper. It may be advisable to do this.

In several cases the measurements of each of these triangles may be tabulated. The pupils can easily see the equality of corresponding sides and angles.

If all the triangles of the class are placed together, or if groups of pupils place their triangles together, the triangles will be found very nearly to lie one exactly on top of the other without any overlapping. ("Coincide" is rather an awkward word for the young pupils.)

An odd triangle will be found quite different from the others,—sure proof to the owner that something is wrong.

The pupils' triangles, allowing for slight errors in measurement, are all of the same size and shape,—a handier statement at this stage than the word *congruent*.

There may be some discussion on what is required to fix the size and shape of a triangle, but this should be informal. The cases of congruence considered above should not be pressed.

EXERCISES

1. Draw $\triangle ABC$ from the given measurements. In each case measure the sides and angles not given.

(i) $AB = 3$ in., $BC = 2{\cdot}5$ in., $B = 40°$. [1·94 in., 56·0°, 84·0°.]
(ii) $AB = AC = 2$ in., $A = 36°$. [1·24 in., 72°, 72°.]
(iii) $BC = CA = 5$ cm., $C = 60°$. [5 cm., 60°, 60°.]
(iv) $AB = 2$ in., $BC = 2{\cdot}5$ in., $CA = 3$ in. [55·8°, 82·8°, 41·4°.]
(v) $AB = BC = 3$ in., $CA = 2$ in. [70·5°, 39·0°, 70·5°.]
(vi) $AB = BC = CA = 2{\cdot}5$ in. [60°, 60°, 60°.]
(vii) $BC = 3$ in., $B = 70°$, $C = 50°$. [2·65 in., 3·26 in., 60°.]
(viii) $AB = 2$ in., $A = B = 75°$. [3·86 in., 3·86 in., 30°.]
(ix) $CA = 3$ in., $\angle C = \angle A = 60°$. [3 in., 3 in., 60°.]

2. Draw the same triangles on squared paper and find their approximate areas by counting the squares. [(i) 2·41; (ii) 1·18; (iii) 10·82; (iv) 2·48; (v) 2·83; (vi) 2·71; (vii) 3·74; (viii) 3·73; (ix) 3·90.]

Use of the protractor to prove some of the simpler geometrical facts.—

1. Draw several diagrams similar to the following:—

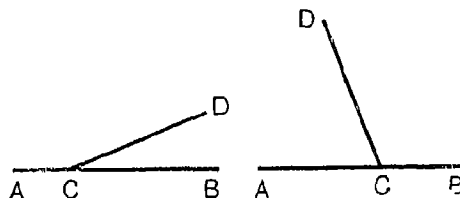



FIG. 41.

Measure $\angle BCD$ and $\angle DCA$. Fill in the following table:

Diagram	∠BCD	∠ACD	∠BCD ∠ACD
(i)			
(ii)			

Draw the conclusion and state it:—If a straight line CD stands on a straight line AB, ∠BCD + ∠DCA = 180° or two right angles.

It is perhaps inadvisable to introduce the terms adjacent and supplementary angles, but teachers should use their own judgment

2. Draw diagrams as under.

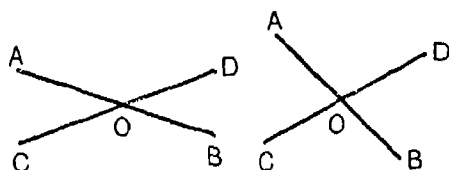



Fig 42.

Measure the angles shown in the diagrams. Tabulate the results.

Diagram	∠AOC	∠BOD	∠AOD	∠BOC
(i)				
(ii)				

What is true in each figure? State the fact proved

If two straight lines cut each other the (vertically) opposite angles are equal.

[The word "opposite" applied to these angles gives no trouble; the word "vertically" sometimes upsets a young pupil.]

3. Draw two parallel lines with a third line cutting them.

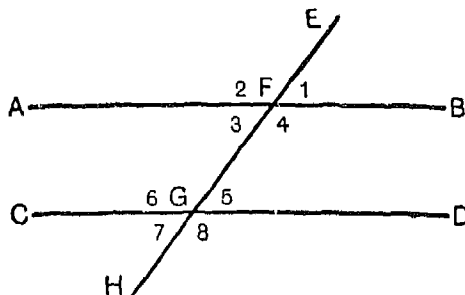



Fig. 43.

Measure all the angles marked 1, 2, . . . 8.

Get answers to such questions as these:—

Are all these angles of the same size?

Into how many groups can the angles be divided according to size?

What is the sum of two angles one taken from each group?

The introduction of the terms alternate angles, etc., is unnecessary. Pupils know enough about the diagram above if they can respond satisfactorily to the following.—

(i) Name two equal angles.
(ii) How does ∠BFE compare in size with ∠DGF?
(iii) Name two angles whose sum is 2 rt. angles.
(iv) What is the sum of ∠AFG and ∠CGF?
(v) If ∠BFE = 60°, what are the sizes of the other angles in the figure?

Too much time should not be spent on these facts. They are fairly obvious. In fact, the approach to 3 should be:—From the appearance of the diagram would you say that all the angles were of different sizes? What angles would you say were equal? Measure these angles and see if it is true that they are equal.

This method of approach, using the intuition of the pupils, should be used whenever possible.

4. Draw several triangles having two equal sides. What appears to be true about

the angles opposite the equal sides? Prove the fact by measurement.

5. Draw triangles having one side equal to 2 in. and the angle at each extremity (i) 30°; (ii) 50°; (iii) 70°. By measurement prove that the sides opposite the equal angles are equal

6. Draw triangles ABC of various shapes. Measure the angles and find their sum.

Fill in the table.

Triangle	∠A	∠B	∠C	∠A+∠B +∠C
(i)				
(ii)				
(iii)				

Prove the same fact by cutting up the triangle and placing the angles to show their sum.

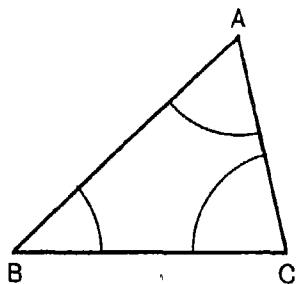



FIG 44

The diagram explains the method.

7. Draw parallelograms ABCD of different shapes and measure their angles

Tabulate the results.

Parm.	∠A	∠B	∠C	∠D
(i)				
(ii)				
(iii)				

The pupils will easily see that the opposite angles of a parallelogram are equal

Simple cases of surveying, heights and distances.—The following examples are offered as types suitable for young pupils. Much interest would be added to these problems if data could be obtained locally for similar problems.

1. A ladder 20 ft. long was placed against a wall with the foot of the ladder 9 ft. from the wall. How far up the wall did the ladder reach?

Scale· 1 inch represents 10 ft.

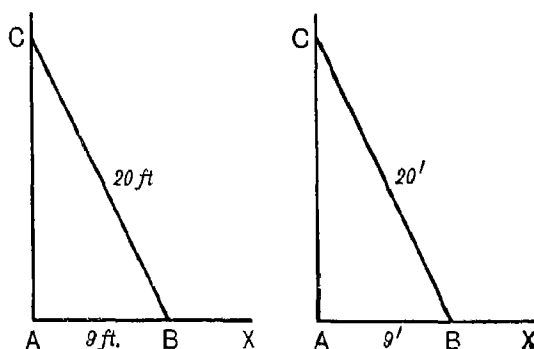



FIG. 45

Develop the construction.

Which line is drawn first? (AX preferably).

What does AX represent? What does AY represent?

How is AY obtained? Do we know where C is? B? How is B fixed? Distance of C from B? How is C fixed?

What measures the height reached by the ladder?

Work would be arranged in some such way as this·—

AB = 0·9 in , BC = 2 in

By measurement, AC = 1·8 in.

∴ Height required = 18 ft.

[The pupils should choose a larger scale.]

Explain the *angle of elevation*,—the angle between a line joining the eye to a point above the eye level and the horizontal line (in the same vertical plane).

2. At a point 20 ft from the foot of a flagpole the angle of elevation of the top of the pole was found to be 50°. What was the height of the flagpole? [23·8 ft.]

[The rough diagram should be suggested by the pupils.]

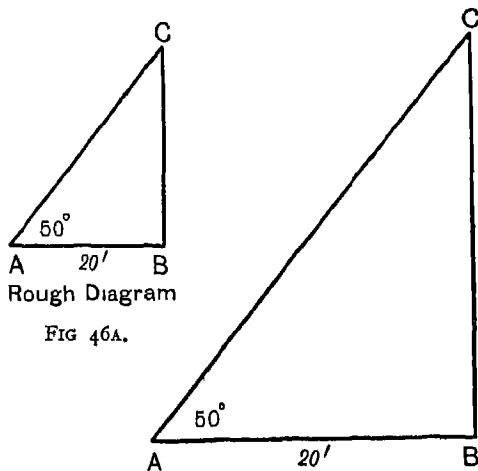



FIG 46A.

FIG 46B.

From questions, using the rough diagram, the construction can be obtained. BC is measured and the required height found.

3. Explain the meaning of the distance of a point from a line.

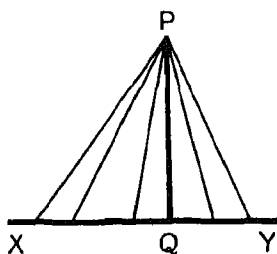



FIG 47

Of all the lines drawn from P to XY, PQ perpendicular to XY is found to be the shortest and is taken as the distance of P from XY.

4. Two boys, 200 yards from each other, found the angles of elevation of an aeroplane passing between them to be 50° and 70°. What was the height of the aeroplane above the ground? [166 yd.]

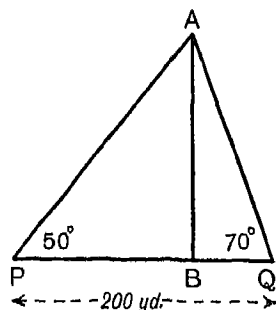



FIG 48

In a sketch of the diagram the boys naturally appear first, 200 yd apart If A represents the aeroplane the angles P and Q are 50° and 70°.

The construction of the figure,—scale 1 in. to 50 yd.,—should cause little difficulty The height above the ground is represented by AB, which can be measured.

5. A boy wished to find the breadth of a river. He stood opposite a bush on the other bank, and then took 50 steps along the straight bank on which he was. Here he put a stick in the ground and walked on another 50 steps. He then turned and walked at right angles to the bank of the river, and after taking 40 steps found he was in the same line as the bush and the stick. Show that the river was "40 steps" broad

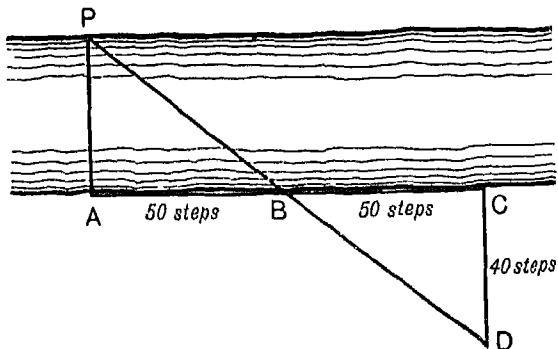



FIG 49

In the diagram, P represents the bush and A, B, C, D the four positions of the boy

PA ⊥ AC, and CD ⊥ AC

AB = BC = 50 steps, and CD = 40 steps.

Construct the diagram as follows:—

AB = BC = 2·5 in (Taking scale 1 in to 20 steps.)

CD ⊥ AC and CD = 2 in.

AP is found to be 2 in.

i.e. CD represents the breadth of the river.

Instrument for measuring vertical and horizontal angles.—A very simple instrument for this purpose may be made in the school workshop or at home. Two thin, fairly narrow strips of wood about a foot long are pivoted at one end by means of a small bolt and thumb screw. This instrument can be placed in a vertical plane or a horizontal plane.

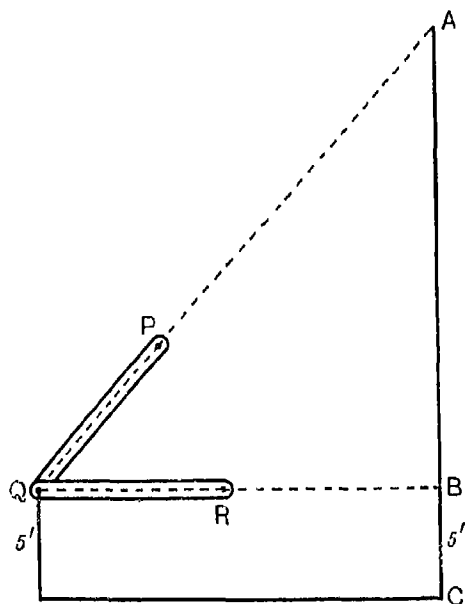
The diagrams show how it is worked.

Ang'e of elevation,
(Side elevation, not drawn to scale)

FIG 50A

The angle can be found more easily if a pin is fixed in each strip so that, for instance, A, the pin P and the pivot Q are in the same straight line.

The angle is found by drawing one with its arms along the inner edges of the strips and measuring it.

For measuring distances it is useful for a pupil to know the distance he walks in taking 100 ordinary steps. This is unnecessary if a surveyor's chain is available.

It is worth while to repeat the solutions of these problems with squared paper. In some respects the work is very much simplified.

EXERCISES

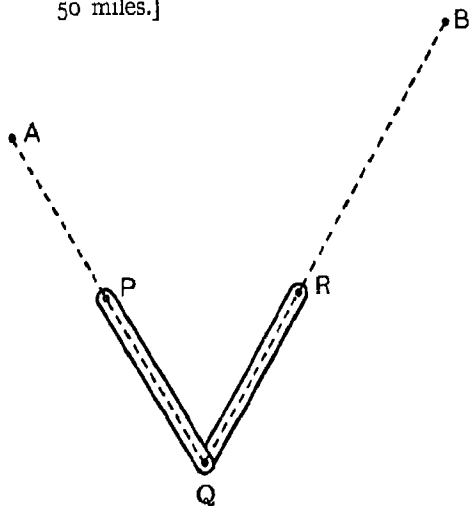
1. The angle of elevation of the top of a building from a point 300 ft. off was 35°. What was the height of the building? [210 ft.]
2. A is 50 miles east of C and B is due north of C. If AB = 80 miles, what is the distance BC? [62·5 miles]
3. A is 10 miles north of P, B is 30 miles south of P, C is due west of P and CP = 40 miles Find AC and BC. [41¼ miles, 50 miles.]

Angle subtended at Q by AB
(Plan, not drawn to scale)

FIG 50B

4. A flagstaff is 50 ft. high. Find from a scale drawing the angle of elevation of

the top from a point 25 ft. from the foot of the flagstaff. [63·4°.]

5. A man climbs 18 ft up a 24 ft. ladder placed against a wall with its top 18 ft. from the ground. How far are his feet above the ground? [$13\frac{1}{2}$ ft.]

6. Two walkers start from a point A. One walks north at 4 m.p.h. and the other north west at 3 m.p.h. How far apart are they after 1 hour? [2·83 miles.]

7. If AB=5 miles, BC=6 miles, CA=4 miles, find the distance of A from BC. [3·31 miles.]

8. A man found that the angle of elevation of the top of a flagpole was 25°. On walking 20 yards nearer the pole he found the angle of elevation to be 35°. What was the height of the flagpole? [27·9 yd.]

9. At two points on opposite sides of a tree the angles of elevation of its top are 45° and 50°. The distance between the points is 100 feet. Find the height of the tree. [54·4 ft.]

EXERCISES IN SIMILAR TRIANGLES

1. Cut out triangles with sides 3 in., 4 in., 5 in. and 3 cm., 4 cm., 5 cm. Measure the angles of the two triangles. What can you say about the shapes of the two triangles?

2. Cut out three triangles with sides 1 in., $1\frac{1}{2}$ in., 2 in.; 2 in., 3 in., 4 in.; 3 in., $4\frac{1}{2}$ in., 6 in. Show that the three triangles have equal angles. How are the sides of the three triangles chosen?

3. Draw two triangles ABC and XYZ having BC=2 in., ∠B=35°, ∠C=65°, YZ=4 in., ∠Y=35°, ∠Z=65°. Measure the sides AB, AC, XY, XZ. Do you see any relation between XY and AB, YZ and BC, ZX and CA?

4. At a certain time a man 6 ft. high had a shadow 9 ft. long. Find from a diagram the height of a man whose shadow at the same time was 8 ft. long.

5. The shadow of a flagstaff is 80 ft. long. At the same time the shadow of a man 6 ft. high is 10 ft. Find from a diagram the height of the flagstaff.

Construction of models.—The construction of some of the simpler models brings very clearly before the pupils the shape of the faces and the form of the solid. The net of the cube has already been given. The nets of a triangular prism, a square pyramid, and a triangular pyramid are given here. The cardboard is cut through along the outer lines, and half through along the dotted lines. Where necessary the edges are secured with gummed paper.

Triangular Prism

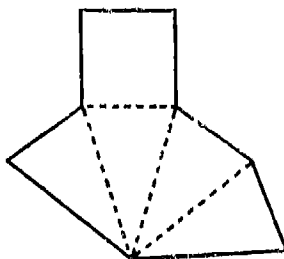
FIG. 51A.

Square Pyramid

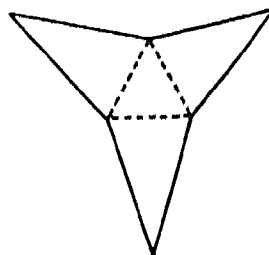
FIG. 51B.

Triangular Pyramid

FIG. 51C.

THE TEACHING OF MUSIC IN THE PRIMARY SCHOOL

From the picture by Ernest Board] [*By permission of the Arti*

THE NEW CHANT

I. GENERAL INTRODUCTION TO THE FOUR YEARS' COURSE

in the form of an imaginary discussion between two teachers on the practical needs and problems of

MUSIC AS A SCHOOL SUBJECT

IN teaching music to classes of children 7 years old, and onwards, we find ourselves as teachers in much the same position as parents find themselves in teaching infants to talk, with this difference that both the quality and quantity of music that a child has overheard in its little lifetime are altogether different, less guarded, less reliable than the quality and quantity of language that an infant has overheard when it is taught to prattle its thoughts in its mother tongue Rhythmic melody is a veritable mother tongue, but it is confused by a great deal of promiscuous musical output which is neither motherly nor lingual,—music which children have to overhear, but which no more speaks to them of things from their own child-angle of thought or imagination, than a flamboyant wallpaper or the garish ornaments of public places conveys or connects with their inner imaginings about simple form and colour

In spite, however, of any and every drawback of confused impressions unconsciously received by little children, we start teaching rhythmic melody with this great natural asset. that the moment a simple rhythm is rapped out, or a rise and fall of simply related tones sounded, the normal child, whatever its surroundings, can enjoy trying to rap out the rhythm itself and trying to sing the tones imitatively in true relation. It is true, I suppose, of children younger even than 7—the age for which the first set of the following lessons is planned—that with one note they can rap out a rhythm, with two notes they can make up a tiny phrase on that rhythm, and with three or more notes, they can be taught (in a few moments) to make up a four-phrase baby tune! The writer has himself received well-built little tunes by children under 4 years old, and this is nothing abnormal. Yet, though there is this sure asset in every school that children enjoy and comprehend rhythms and rise and fall of a tune, and though the normal child is a natural melodist, the teaching of singing in schools seems at present in much need, not only of room to grow, but also in need of organisation and reform Furthermore, advance is of necessity in the hands of teachers, many of whom either are handicapped, or modestly feel themselves so, by having received no really effectual preparation and equipment for teaching the subject To them the difficulties, troublesome to the best equipped, seem abnormally discouraging. Music is truly an ideal school subject it gives the children unique outlet for initiation and teamwork No teacher, however "unmusical" he may think himself to be (however "unequipped" in the technical sense), need feel daunted, especially before a class of juniors; for all will respond instantly to a teacher who gives them something naturally rhythmic to rap out or to *fa la la* together. The particular aim of this section of *Teaching in Practice* is, if possible, specially to serve the needs of teachers and children who both alike may be called beginners For this reason the writer begs his fellow-teachers to bear with him while he tries to get down to the foundations of the matter with them. By so doing we may hope to grip the simplest teaching essentials in practice With a view of bringing fully to mind

and then facing together the full array of practical difficulties which beset the subject of this section of *Teaching in Practice*, it has seemed well to throw this Introduction into the form of a full and free imaginary discussion between two very keen teachers, thus:—

AN IMAGINARY CONVERSATION

Teacher I. How to make music a living subject in every school in the country,—that's our subject to-day, that's the knotty problem.

Teacher II. To think that even 2,000 years ago the Greeks looked upon music as a tremendous humanising factor in education!

T. I. And I rather fancy it must come to be a still bigger factor 2,000 years hence.

T. II. Well, there can be no doubt (*a*) that it is a permanent form of Beauty; and (*b*) that it can be infectiously cheerful.

T. I. And (*c*) that it involves the finest teamwork, and what seems still finer, *team-thought* passing into *team-action*.

T. II. Let's agree anyhow to suppose that humanity is never going to let such a superb pastime as music drop. Children 10,000 years hence will, perhaps, ride in their 'planes through the heavens to school, but on any sunny morning as they go, they will be singing for love.

T. I. And yet we schoolmasters seem so terribly casual about it as a school subject, and parents don't seem to kick, or mind in the least. Would you believe it? An inspector friend of mine told me he struck a first-rate school the other day, where, as no single teacher on the staff happened to be musical, the only music they had at all in the school was *one hymn per term!* The head mistress admitted to my friend that the girls nearly mutinied about it.[1]

T. II. Come and let's discuss the whole question together for a while, and compare notes; for I feel just as strongly about it as you, and cannot see daylight. Like yourself, I long for the children to get the benefit of music, I mean the beauty of it, and the cheeriness, and the first-rate teamwork of which you speak. I feel in my bones that it could, if properly organised, be the most vital everyday factor of the school year. But I confess the practical difficulties daunt me, and always have done so. I am told by musicians, by school-musicians, too, that we shall never do anything with music as a nation till all our children (except the 1 in 500 tone-deaf) are taught to read any reasonable melody at sight, as they read the Bible or a newspaper.

T. I. As to that, at my own school, even classes from 10 to 11 plus, cannot read the simplest nursery rhyme in the very simplest musical setting,—at *sight*, or anything like it. You see, I have no teachers on my staff who can themselves read melody, still less teach it.

T. II. We seem to be in a really vicious circle at present; for my friend the principal of —— Training College tells me that his students arrive at college without the slenderest working knowledge of how to read melody. Of course they do. He puts it that they arrive, perhaps aged 19 in other things, but aged 9 in music. As we know too well, at a college, as at school, to-day's crowded curricula tend to oust music.

T. I. The question is: how can we, on the basis of, say, thirty-six weekly periods of twenty minutes each year, help to lift what we may call school-melody (and in that I include team-singing of melody) out of its present uncertain state as a school subject, so that it may become a real engine of education?

[1] This came within the writer's own experience.

T. II Thirty-six twenty-minute periods will give us twelve hours of musical teaching in a year. In that fragment of the year's time-table we are to teach all our children to read fluently any simple melody at sight. It seems impossible

T I. But wait a moment. Hard as even that may seem, is it not clear that the act of reading at sight is after all a preliminary, subsidiary affair? To be able to read any language is essential as a means to an end if you are to enjoy anything that language can bring you. But in music, as in poetry, or any subject under the sun, the mere ability to read is surely entirely subservient to the ability to understand and enjoy the thing itself; the melody, the poetry, the literature, or the conversation are infinitely more than the ability to read them on paper. Written signs which convey the poetry, or literature, or play or whatever it may be, are as a trifle compared with the experience of the thing itself.

T. II Yes. And knowing all this, and being in the same difficulty as you are, I go straight to the point in my school, and teach my children as many songs *by ear* as I can, in spite of the musical experts' warning that this is all wrong. I want them to experience the song straight away

T. I. Well, though you are told that it is all a mistake to teach music by ear, I'm certain you are right. I am sure that it is crucial, at all costs, to get the children happily singing at each lesson. Teaching them to read a language they never use, that is, that they never experience in intelligent action, is, in my judgment, not only unkind, but silly. So I, too, get through, or I ought to say muddle through, a song each week as best I can by ear, in order to get music going at all. This rough and ready method is but common sense of course Make a start with hearty team-singing. Then on that begin to teach. Yet I feel uncomfortably that each week the time is gone before I get to grips with the subject. I get my children happy that way, but not well-grounded.

T II. The most I ever manage is four songs a term, and with that I am as busy as I can be getting the children not only *on* to the tune, but persuading them neither to shout nor to mumble, but to sing with a decent tone,—"well-produced," as they say.

T. I. Yes, and this brings us really to another full-size problem in our twenty-minute period I ought, I am definitely told, to teach my children to produce good tone, teach them, in fact, so-called voice production!

T. II. Did you ever hear Sir Walter Parratt's immortal remark made to a blackbird in spring· "Ah, my little dear, you'd never sing like that if you'd been taught"?

T. I. Still, when all is said and done, I suppose Sir Walter taught his own choir boys neither to shout nor to mumble?

T II. Probably he'd something to say to them on tone, and gave them exercises daily. But yet I do also like the pre-Victorian remark of old Dr Cooke to an admiring lady who asked "My dear doctor, how *do* you teach your boys to sing so beautifully?" "Madam, they teach each other"

T I. Mine teach each other to shout!

T II. Yes, that is where the force of tradition comes in, hindering or helping us We have, of course, to see that bad traditions are banished, crowded out by good ones. Your boys shout Mine seem to have the tradition of, what I may call, the hardened throat. To maintain a good tradition is hard enough; to eradicate a bad one is only possible to those who have time and ability to put a good one in its place, and, incidentally, who possess the patience of a super-Job

T. I. So far then in this puzzling matter of teaching music throughout our schools, we have agreed as to *three* needs at least, which probably most teachers would confirm In whatever time we can spare to give to music, and from the very first, (1) the children must make music themselves at every lesson, though it be "by ear", (2) they must learn

to sing with decent tone, and (3) they must learn to read at sight, as quickly as may be, what they sing.

T. II. By the way, wouldn't you add the need for a fourth thing; *memorising* tunes? In teaching any other language, it is of the essence of the contract to teach our youngest children to recite little poems by heart, without the distraction of the eye in reading the written page. They really then get into their subject

T I True, I suppose the imagination is only free to enjoy and deliver a tune or a poem when unhampered by the slightest conscious effort to be reading with the eye, what is supposed to be possessing the mind.

T II So our class work in music stands at present as follows:—

We are to teach—

1. Singing imitatively (i e. by ear);
2. Singing with good tone,
3. Reading melody at sight;
4. Memorising melodies

And as a practical proposal, how about allotting five minutes to each of the four in every twenty-minute period?

T I Your list is good and your plan sounds more thorough than most, and perhaps more hopeful in practical ways than any I myself happen to have evolved or have seen on paper as yet. But I feel, in a way, more uncomfortable than I did The list looks already rushed and crowded And, aren't we somehow leaving out Hamlet from our play?

T II I wonder what you mean by that uncomfortable remark! We have certainly left out teaching the children to write music down on paper. We've also included nothing for them to do but to sing Are we to provide for any playing? The school orchestra can surely be tackled later, when the class-singing, the reading at sight and the memorising are attained. Or am I wrong?

T I Yes, I think you must be wrong there in some fundamental way It will surely never do to delay team-playing altogether till team-singing is secure. We should be missing a whole field of splendid possibilities for musical teamwork, if you leave out the idea of the junior school band altogether, and make no provision of some means which will lead up to it, if it's nothing more than tapping a triangle during the songs But both writing tunes on paper—a small but useful matter and one that even the babes will enjoy—and the teaching of any sort of playing as well as singing must be added to your *practical* list, then your allotment of precious minutes had better be changed thus:—

	Minutes
1. Singing by ear	4
2. Toning and Tuning .	3
3 Reading at sight .	4
4 Memorising .	3
5. Playing	3
6 Writing out a tune	3
	20

T II Isn't my practical list, as you call it, fast becoming intensely unpractical and ridiculously divided up and overloaded?

T. I. Yes, I'm afraid it is, and all with Hamlet left out.

T. II. I half guess what your Hamlet is going to be. You are naturally asking, "Where does music as a subject come in at all?"

T. I Exactly! Singing itself is good and very enjoyable, but it is, after all, a mere means to a sensible end, as much as talking is a means to an intelligent end. Reading at sight, too, is a mere means to a further end, viz. to get more music, also memorising is a means, viz. to get the same music again and again, and to get it at times when we've no books and we most need it—years hence, perhaps, in the same way writing and playing are also merely means.

T. II. Yes, mere singing, mere playing, with mere reading, writing, memorising are none of them music itself; and mere singing by ear is an unconscious process perhaps. I am with you in all that. Only let us keep our heads,—about these six practical items, I mean. Before I concede you perhaps half the play for Hamlet himself, and above all, before you or I think of any more practical needs to be added to our six subsidiaries—for I've got thoroughly frightened that your ideal Hamlet may spring upon us one of two more practical attendants—let us examine our list as it stands, and see if some of our six points can be receiving attention at one and the same moment Surely this will not only ease our time-table, but make for efficiency by coupling up what I imagine are really inseparables For example, the acts of singing and reading will always go together, as will the acts of singing and memorising when not reading.

T. I. That sounds important and hopeful

T II I know a teacher who has found that even the act of writing down a melody is greatly speeded up and made easier, if the phrase is sung over and over again *as it is being written*. Nos. 3, 4 and 6 can surely work in with No. 1! So can No. 2 if the teacher is carefully parenthetical!

T. I. This sounds still more hopeful. Let us dwell on it and revise our time-table accordingly.

T. II Wait a moment There remains No. 5. Of course playing goes as closely with reading at sight and memorising as ever singing does. But let us go a big step further than that. Your chance word just now,—that a baby junior might "even tap a triangle *during* the song" and so be learning some day to be in the school band, or school orchestra—gave me the sudden idea that singing and playing could and should go together in the early stages, even among the very little ones, as well as in the final triumphant stages of the school's music when the school choir and orchestra produce, perhaps, a Handel Chandos Anthem, or a Christmas Oratorio, or even a home-made Cantata written by the scholars themselves for the Prize Distribution!

T. I. Come, we are getting on. Indeed aren't you going much too fast? But in the main I am certain you are right. Let's revise our time-table at once and drastically Let me try a new wording:—

	Minutes.
1. Singing and Playing (by ear and sight) .	8
2. Singing and Playing (by memory) .	4
3 Toning, Tuning and Timing . .	5
4. Writing out a tune or phrase . .	3
	20

T. II. What do you mean by the expression *by ear and sight*? This seems contradictory Surely they are mutually destructive?

T I. No. I begin to feel they are exactly the reverse, mutually supporting When you said that you teach your children as many songs as you can *by ear*, you meant I suppose (as I did) that you get through as many songs as ever you can—with or without books in the children's hands—and let them pick up their notes as best they can in the process. But our search for thoroughness and for time saving has helped to convince me on a point that I have long puzzled over. Surely the dispute between teaching *by ear* and *by sight* is a bogus dispute? *The two never should be separated*, till the memory takes up the work of both. Eye and ear must habitually work together.

T. II. Then do you memorise the sound of a tune to the ear, or the sight of a tune (on the page) to the eye?

T. I. Both together and always, of course. I remember that Plunket Greene (who always sings his complete repertoire by heart) once told me that he memorised photographically, it was seeing the exact position of the melody by memory on the page that saved him in a tight place

T. II. You would say that as the eye and the ear have to work together permanently in music-reading, the only two wrongs we can do in this matter are to let our children hear tunes and not see them, or to let them see tunes on the page and not hear them!

T. I. Yes, and I fancy that when the Board of Education utterly and finally discountenances these two wrongs, and backs up its ruling by allowing us adequately to requisition song-books for every scholar in every school, we shall soon have a population of melody readers.

T. II. I agree Why did you allot 8 minutes to *ear and sight*, and 4 minutes to *memorising*?

T. I. I have in mind that at each lesson, the *ear and sight* partnership would mean that the singing or playing or both would be devoted to reading and learning a new piece or pieces each week. The new melody is in front of each scholar and is heard and read simultaneously, then attempted, phrase by phrase, I suppose. This would take the major portion of time, and would need the most concentrated effort Then, as much as possible of the chief new melody of the week would be sung or played by memory for 4 minutes. To fix the sight of the notes to the sound of them is the first business; to attempt the phrase heard and seen *while listening and looking* is the second and big business; to deliver the goods by memory is the third business, total—12 minutes.

T. II. I noticed that you have expanded our cultivation of tone into a threefold heading: *Toning, Tuning, Timing.*

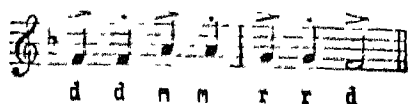
T I. Yes, because I foresee that when the great matter of hearing, reading and performing is over, the class would need not only to *blend* their tones into good team-tone, and *tune* their tone exactly with each other, but also *time* their utterance together. The sensitised listener, in order to become a good teamworker, would, I fancy, need to think of the three inseparably; although in actual practice I am sure they receive special concentrated attention one at a time; just as each is consciously in default.

T. II. All this in 5 minutes?

T. I. Well, remember our time problem! And, besides, remember that the Timing, Toning, Tuning will more and more pervade the rest of the lesson as time goes on. It will become habitual to attend to each as it arises in passing.

T. II You have convinced me of the inseparability of the whole task. I begin to hope that good tone, good tuning, and neat rhythms will become so much *the thing* in our schools, that your No. 3 heading will actually be receiving constant attention during Nos. 1 and 2.

T. I. And you agree that the writing out of the tune of the week, or even the chief phrase of the tune of the week, should really be good fun for all, provided it did not take more than three minutes, during which time the whole class could hum or whistle the tune

over and over again as they wrote it. Whistle or hum or sing or otherwise evoke a fragment like this:

in a cheery way and repeatedly, and not the stupidest child (with his own little music book or home-made staves all drawn ready at each lesson) could fail to get some fun, some good, some real interest out of the effort to write the chief fragment of the music he had heard, seen, sung and memorised, at that lesson.

T. II. Well, we've largely cleared the stage of overcrowding, and we've grouped our subsidiaries. Now! What about your beautiful Hamlet and his possible further attendants or subsidiaries?

T. I. My only trouble is that my Hamlet seems at the moment more like Mrs. Gamp's friend, Mrs. Harris. What if there "ain't no such a person?"

T. II. What! Are you backing out of it, my brave advocate! Let *me* hold forth for a minute on the main issue. As I understand it, your chief care, your chief reason for making music a great school subject, a great aim of the educational service—in fact your ideal—is, so far, not allowed for at all in our time-table. All we have got, *so far,* is a list of essential means to an end,– the end is still *music itself.* You feel that we are rather like well-meaning people who piously decide that, let us say, French shall be taught; and we then proceed to lay down plans for the hearing, reading, memorising and writing of French every week without providing that the children shall learn the meaning of words in French, or a single thing about French syntax!

T. I. That is the kind of trouble I feel, but yours is not quite a safe analogy to define it accurately.

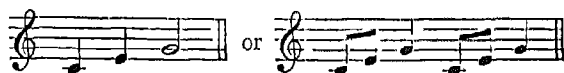
T. II. Why?

T. I. Because music seems to me both more and less than a mere language. We are getting rather deep in.

T. II. O dear, O dear! Let's risk it and go off the deep end, anyhow, for a moment. Would you say that music in one sense means *more* than a language, such as French or Sanskrit, and that in another sense it means *less* than they?

T. I. Yes, and the word *meaning* helps us considerably here, if we take great care to distinguish between different kinds of meaning To take an extreme case: think what a lot of explanatory teaching would be needed in a French school if an English child suddenly said these words: "I tried to pare a pear with a pair of scissors." The very sound of the sentence would raise all sorts of questions to be answered and explained, and it would not be made easier by the fact that the same sound as it made by *pare* and *pear* and *pair* might all alike suggest *père* to a French child! Now, if on the other hand one sang a little musical tune to English and French children alike, with the same sound occurring in it in the same way four times, it could not, as it occurred, have four totally distinct meanings, however much we might wish it to have, as *pear* and *pair* and *pare* and *père* do; secondly, it could not make nonsense in the first three uses to a French child and make sense in the fourth, as it would in the case of looking at or hearing the *words*:—

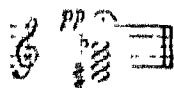
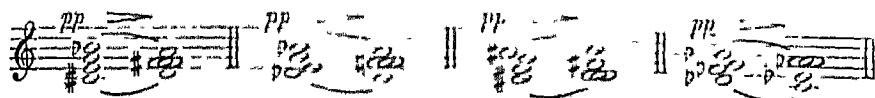
Sing that little song several times, and the essential difference between customary *verbal* meanings in language and *tonal* meanings in music may become a little clearer. Or rather, sing or whistle the tune as a complete little musical sentence without the words; then say the words as a complete verbal utterance without the tune, and at least it is clear that both are a communication of sense in sounds uttered, perfectly parallel in detail, making the same sound four times and only four times, but the words carry a complex meaning which the tune does not Does this imply that the tune carries *no* meaning which a teacher could and should be able to discuss with his scholars? Manifestly not. The musical sentence is sensible. Now my real heart-searching trouble at the moment is due to these few facts: (1) that I feel the meanings of tones in music are at least as real and important as those of words in language, though mostly very temperamentally variable; (2) that they are none the less real even though they are infinitely various and variable; (3) that so far as I've observed, children are quick to appreciate musical meanings in a most natural way, and, what is more, quick to attach meanings themselves, and that they love to do so; (4) that the promiscuous worldly use of music for all sorts of purposes,—morning, noon and night—tends unhappily to blunt our adult perceptions of its primal meanings, (5) that I myself don't rightly grasp the subject; (6) that there are people who, not grasping it, assume that music *has* no meaning at all,—to return to our personal simile—they assume that there "ain't no such a person,"—that my Hamlet that we were leaving out of our play is not a Hamlet but a Mrs. Harris. For the play of *Hamlet* played without Hamlet every one living would detect and deride. But music, alas, without musical meaning, without its chief character, is an accepted everyday affair.

T II. I think I've caught the general drift of your deep-end meditation. And I think I see why our analogy with a language will not take us far. In music the sounds (tones) *are* the thing. In language the sounds (words) are not the thing, but merely evoke the images or thought of the thing So when our children use precise words like *threepence* or *sixpence*, the sound is not the thing, but the things which intelligence and teaching have taught them to associate with the sounds. But when they sing

the sounds *are* the very thing itself, *they are the MUSIC*, and our practical programme will teach them to be able to make the sounds and enjoy them, and I should be inclined at the moment to add that if (as you suggest) the making of sounds has a meaning that matters, then heaven will teach them *that*, while we teach them the practice of music. In short, if we promote its practice, its nature will dawn upon them. How about that, dear old Idealist?

T. I. Well and good. I'm certain that you've got hold of a very important truth there. And to it add this thought arbitrary meanings given to this or that melody or chord or rhythm, and then as arbitrarily taught to children would be a very doubtful blessing indeed, and would (to say the least) continually be in need of revision.

T. II. There's danger there.

T I Yet,—think a minute more. Even verbal meanings grow whimsically, and very slowly during use, and meanings are made and accumulate and change down the ages. They are often capriciously assigned and used for a fleeting moment, like the meanings given to the words *stunt, blighty, napoo,* etc., in the Great War. And I should be sorry to think, indeed I *cannot* think, that musical phrases, chords, and rhythms never shared

in such playful processes, and never acquired real meanings in just the way that verbal quips and phrases do, and that we, as teachers, must be silent about a thing of such interest And, by the way, I read an amazing fact about chords not long ago in an article called "Chord-play in music," in which the writer showed conclusively that there is definitely such a thing as a musical pun! If you say the word *box*, and nothing else, you call up no certain image, do you? A word that happens to have two or three meanings, has no certain meaning till you give it a context. The moment you link it up as in *box*-tree, *box*-seat, or "come and *box* with me," then the context defines the various meanings And, in music, I'm told if you play this chord to a musical person

it has no certain meaning to the mind until you give it a context. Then it can easily have three or four different meanings, in three or four different keys or contexts:

Get someone to play these to you over and over again, softly and slowly, and—it has really an amazing effect of saying something mystically, yet definitely different each time, even to the uneducated music lover. So far, indeed, has musical usage travelled along the path of language that the musical classics, I am told, are full of delicious "chord-play" of this significant kind, capable of giving exquisite new turns of thought to a melody as it is unfolded by a Beethoven or Schubert. And this aspect of music is in its very infancy.

T. II. I suppose that you will grant that these subtler meanings and the mental delights they may give are far and away beyond our *school* stages of simple and elemental melody?

T. I. Yes; yet do not forget that the Promenade Concerts are most crowded out on classical nights; and not with musicians, but with keen city clerks who love to hear and follow the master minds in terms of pure tone. Personally I am forced to believe music is, from first to last, a definite language, as well as a rhythmic and delightful deed.

T. II. Very interesting and stimulating. But now let's try to climb out of the deep end. I want to make a suggestion—that, at least for the time, we drop the analogy of language, and try another, which, though connected with language, may bring us more light on the problem. Think our discussion is on how to teach *literature* or *poetry* in the schools. And now let us hark back to our practical list, and see if we can track down our Hamlet,—our one thing needful in music, which we both feel is unallowed for in our list. Suppose that in order to *teach* team-utterance of poetry for 20 minutes a week, two teachers of poetry, as keen as we are about music, have laid down the *following*:—

	Minutes.
1. Speaking poetry by *ear and sight* (that is imitatively and by reading)	8
2. Speaking poetry *by memory*	4
3. Toning and Timing of team-speech	5
4. Writing out a chief line or verse	3
	20

They will not have done badly for their class from the practical point of view. Will they have left the thing itself out?

T. I. Carry the test further Suppose that our task was actually to teach children to understand and enjoy not the utterance of music, but the *utterance* of prose, poetry and literature—whether oratory, essay or narrative—would our practical programme hold, or should we drop team-utterance altogether?

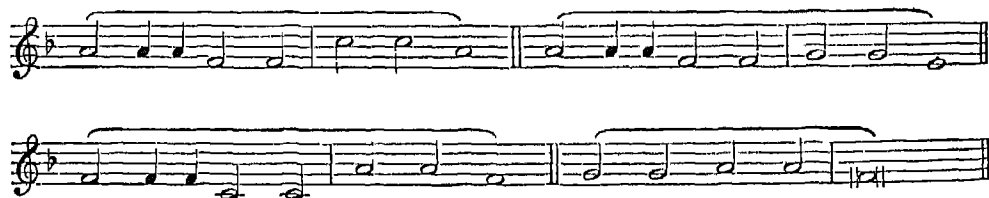
T. II. Well, personally, I rather think we should gain greatly by following the same general scheme and retaining team-utterance of good prose. The pull it would have upon memory, and the value of measured utterance while reading, and the relishing of the very sound of a great sentence which it would bring to the mobilised team might be absolutely great in its effect! And, anyhow, I think we are tracking our problems down rather more effectually by this route. Whether in music or poetry you will simply have to teach *fine form* and a taste for *fine form*, by whatever practical methods you adopt. We have been pondering over the questioned meanings which may or may not be subtle and endless Let us think neither of the meaning of music nor of poetry nor literature. Leaving detailed meanings to take care of themselves for the moment, let us concentrate on the whole aim or design of them Team-utterance or no team-utterance, team-practice or none, we seem to have arrived at the aim of all art.

T. I. True. What is the aim? Fine design; fine form, and constructive joyous effort to that end You may say the end of art is not *in*formation but *con*formation, not *in*struction but *con*struction.

T. II. Splendidly said, I think! So with literature and with music, we must teach, in however elementary a way, the fine design, fine utterance, the perfecting of form, or as you call it conformation or construction As well as the mere act of singing that which you want them to sing, drawing what you want them to draw, the mere act of speaking poetry (or any other form of art) which you want them to speak, the children must have a constructive chance to try their own hands at design—at the real thing

T. I. Here at last is my full Hamlet! Since children love construction and design, *if it is within their comprehension and powers to carry out, and it is*, we must clearly teach music from this fundamental point of view, and give them a chance (every week, say I) to design their own small tunes, just as we give them the chance to write their own small essays.

T. II. Up till now I have rather thought of tune-writing in schools as a musician's fad.

T. I. I can give you the answer to that; as it happens I have lately been given this genuine tune invented by a child aged $3\frac{3}{4}$ and written out at the child's bidding by her mother, who was, she said, specially commanded by the little composer to make the last note a really "long one" —

T. II Well, even if this is nothing more nor less than a new kindergarten game for the children age 7 to 8, I'm *for* it, every time, everywhere!

T. I. I agree. Add tune building to our programme, and it may at last be complete, who knows? We must make provision for short lessons on tune building, and allow for tunes

to be written during the week by the children themselves (just as they might write little essays), these to be given in to the teacher so that the best of them may be played or sung and commented upon during the lessons Each child could keep a small manuscript book and copy his or her own tunes into the book; the teacher could select a few of the best for use at the lesson.

T II. Can we get our revised time-table down now? I am quite thrilled to feel nearer than ever I felt to a hopeful solution of this baffling and disquieting problem of school music.

T. I. Before doing that, do you mind a further short delay? I have an idea that we can extract one more immediately helpful idea from the analogy with poetry We speak of the love of *fine form* and *design* being a central factor in all the arts. But I have an idea that in these days, at all events, but probably at all periods, what is most wanted is that teachers should hark back to the simplest ideas of the Beautiful, and accustom the children to *dwell upon them* in every form; I fancy that in so doing we may soon be halfway to the vital teaching of *form* in music, poetry, literature, painting and modelling—indeed in all the constructive Fine Arts. For example: it was in my mind just now that if we were but to utter—slowly and quietly in class—the mere words—trees—grass—dew—flowers—clouds, we should quicken certain definite imaginings—in very varied degrees, of course, and very likely much blurred in the minds of most of the class. Songs dwell on words, giving them (or they should give them) high values, their highest values perhaps Now, if we happened on the way to school to have been thrilled ourselves by a particularly lovely morning glory, and on reflection we knew it had been made glorious to us by the very things just named—clouds, trees, grass, etc.—and if we wanted to quicken the class to share our enjoyment, we might next try the addition of any descriptive adjectives that would make the picture resemble the one that has given us delight, and so carry the delight quickeningly to the class, thus: "As I came to school to-day I saw tall, quivering poplars; very green grass; sparkling dew like jewels at my feet; flowers of many colours, billowy, white clouds sailing fast across a very blue sky" By some such faithful and simple description we do not, it is true, arrive at fine literature, any more than the best daubs we could make on canvas would give our scholars a fine landscape of what we had seen, but we should be on the way to quicken in the children and in ourselves both the understanding of Beauty and the desire to dwell upon and describe it beautifully Now, *is it not possible* that the same may be entirely true of musical tones, phrases, chords and rhythms that have delighted us? They undoubtedly have a like thrill of Beauty and lovability in them, and it is THIS that we have to build upon.

T II. Good man: I'm with you utterly. And now, before we draw up our time-table, I should like to add what has been in my mind while you spoke. In addition to our weekly lesson, surely we can, with a good wireless set and a gramophone and by very careful selection, give our scholars innumerable chances to listen to such landscapes in tone as you have been picturing. I was thinking a great deal about Robert Bridges and his views of school work. Surely he was right in his hope that the future would see Beauty daily presented to school children as an essential part of their life and education. Thank God for the pictures on our walls, and for trees, hills, clouds, and such comely buildings as our children may see on the way to and from school! But Bridges hoped that the perfecting of Broadcasting would bring the infectious beauty of music, poetry and literature into the most remote village schools. I'm sure they will come, and I hope quickly. But I do wish the B.B.C could do still more to ensure our supply of music to the children of Britain in fitting ways and at times when they can listen

T. I. I think they will.

Now for our time-table revision. Will this do?

SUGGESTED TIME-TABLE

	Minutes.
1. **Singing a known Song** (first from the notes on the stave, then from memory).	3
2. **Toning, Tuning and Timing Exercise** (on rhythms and phrases in the Lesson Notes)	3
3. **Learning the Song of the Week** (by ear and sight)	4
4. **Working on the special Lesson of the Week** (and making up together at least one line of their "own tune")	6
5. **Writing out Tune** (or at least one line of same)	4
	20

SUMMARISED HINTS TO TEACHERS ON THE ABOVE TIME-TABLE

1. On singing a known song.—The rhythm of the song chosen must be set swinging at all costs. Use the rhythmically gifted children as leaders Give all a chance to ask for a favourite song and let the one who chooses it set it going, failing one, try another, then let the others join. Another good plan is to repeat the first phrase over and over again till the swing is big enough to proceed. Never fail to keep the children's eyes on the copy, which is the "map of the song". If time is running short, let singing one phrase or more by memory suffice The power to sing a whole song by memory will increase and speed up wonderfully with practice.

2. On toning, tuning and timing.

(*a*) For hints on *Toning*, refer to the Lesson Notes Let each child seek his finest loud tone. They will at first love the fun of making an ugly "hooligan" sound, and then, when you ask them to sing in a lovely tone but *just as loud* as the hooligan tone, they will develop good tone by leaps and bounds. Use the sound of the word "lord" on

a great deal, holding it 5 or 6 slow beats, getting louder, and then 3 beats or so, getting softer.

(*b*) *Tune* by the habitual game of "target-shooting". This consists (as described elsewhere) in hearing a particular note sounded, taking aim at it with the voice and then listening correctively to the specified note softly touched on an instrument. Children love this game and often quickly excel at it. Let them rival each other, and the standard will go up.

(*c*) *Timing* of team utterance is best done on any rhythmic line of poetry or a fa-la-la rhythmic phrase. Not a single child's voice must be "out of time". One minute's definite exercise for each of the three at each lesson should suffice.

3. Learning the song of the week.—This is best done by what may be called the four-lap process.

(*a*) Let the song be sung or played through, the children watching the copy.

(*b*) Let the song be then sung phrase by phrase. first phrase by teacher or leading voice, second phrase chorus and so to end

(*c*) Reverse this alternation, chorus for first phrase, teacher or leading voice for the second, etc.

(*d*) Lastly let all sing all. This plan gives time for mental corrections, yet keeping the song swinging along. *Never break the rhythmic swing* Bind all laps together at all costs, if by nothing more than by rapping out the rhythm on the desk with a pencil. *Let all feel swayed by it together.* In this way it will grow irresistibly and habitually stronger; and rhythmic cohesion will become the healthy habit of the team.

4. Work on the special lesson of the week.—Work on the Lesson Notes. Let any lesson last many weeks if need be Freely vary the order of the lessons Thus if the children specially need one kind of lesson, or ask for it, let them have it till it is mastered, but vary the detail. Do not consent to a dull moment Encourage them to ask questions, and sing scraps of the tune singly, and "correct their own faults" before the whole team.

5. Writing out tunes—The details described in the Lesson Notes, should in all cases be followed. At first this process will be slow It will soon become familiar and speedy. Start invariably on speech-rhythms or on set dance-rhythms. Children are good at these. Use repetition continually on an unbroken rhythmic swing, e.g.

Any such fragment can be set going (before a song in that rhythm) till all are ready to write the first line down almost as quickly as singing it.

II. TEACHER'S POSTULATES

THESE notes on first steps in music are being prepared at a time when (as the writer is informed) 12,000 hours of musical performance are being broadcast annually from London! In face of this new fact in the world's history, the task before teachers of music in schools becomes one of new importance Anything done there musically must be thought of to-day as a first stage towards a new public culture and understanding of music, and of rhythmic melody in particular, now made possible for the first time.

We are here concerned with four short steps (for children from 7 to 11 plus) in the direction of adult equipment for lifelong enjoyment of music With this in mind, the following few postulates may perhaps with advantage be formulated and offered here.

Let it be supposed:—

(1) That the ordinary child of 8 has overheard and will overhear during its days at school and afterwards (whether it wants to listen or not):

(*a*) multitudes of rhythms of the four-square order;

(*b*) more tunes in the ordinary major scale than in any other;

(c) multitudes of harmonies of the tonic and dominant order;
and that these will inevitably make unconscious impressions,—unavoidably both good and bad.[1]

(2) That apart from these outer factors children also have from the first:

(a) innate love of "go" or *movement* in any form seen or heard;
(b) love of *design* or pattern whether seen or heard;
(c) responsive love of *rhythm* (which in music may be defined as "go" plus design).

(3) That *Repetition* of any enjoyable rhythm or tune pleases and helps the child-mind, till it has had enough of it.
(4) That, when repetition has taken effect, there is a natural love and readiness for *Change,*

(a) *by contrast;*
(b) *by development.*

(5) That there is an innate and permanent pleasure in finishing an experience,—in what may be called the *happy ending*
(6) That children also naturally love and can beneficially be employed in

(a) *detecting differences;*
(b) *detecting likenesses;*

and consequently in tones or rhythms or tunes put together in ways that bring out their difference in likeness, or likeness in difference. (This seems part of the innate love of design—see 2 (*b*).)
(7) That *personal power* to do things—including the personal exercise of choice and control—is in itself attractive to quite young children.
(8) That doing things together (i e. *teamwork*) is also in itself attractive.

As a corollary to (7) and (8), teachers may well add and ever bear in mind the marvellous double pull that can be set up when each child is intent on working for the team, and the team intent to do its team-best for the individual The big significance of this interaction of two primal impulses perhaps comes out more at senior stages, but teachers will find early ways to bring the baby-egoist to know that he is really a baby-altruist as well!

To summarise the above eight postulates (as they apply to our special task), teachers of school music must have in mind the child's natural interest in and sensibility to the following ten elements of interest:—

Energy, design; rhythm; repetition, contrast; development; finishing; detecting likenesses and differences, exercise of personal skill; teamwork

But above all and beyond all, in the opinion of the writer, the teacher must postulate in the child an unfailing love of all Imaginative Wonderment, especially of active wonderment. Hence the value of giving them the chance from the first to make up their own small phrases and tunes, linked with some imaginative experience culled from their own lives and lessons and games.

[1] The badness seems to lie in the unmindful din and often noisy iteration with which harmonic formulas once fresh and delightful, but now stale and defaced, are hurled ceaselessly at our ears

III. RHYTHM AND TEAMWORK

THESE two factors, Rhythm[1] and Teamwork, seem to stand first in practical importance to the teacher of music in schools, and need close consideration in relation to each other here.

"In the beginning there was rhythm," said Bülow. It seems impossible to imagine a child in the world totally devoid of the sense of rhythm. Inertia or shyness may hide it, wilfulness, discouragement, or almost any little perversity or untowardness may tend to prevent children, for quite a long time, from beginning to enjoy and show it. Yet it may be taken for granted that both the sense and the ability to show it will, with a little encouragement, unfailingly appear in the very young, yes, even in the mentally defective A primal rhythmic sense will give every child the power to thrum a simple rhythm with the hand or fingers on the school desk Now the due use and effect of teamwork in music seem first and perhaps mainly dependent upon this sense

The whole school output in music, it may safely be believed, is most fortified by the development of a strong team-sense of rhythm, and marred by the absence of it. Teachers must often notice how the confused edges of phrases in chorus and the little defects of many personal kinds are (as it were) spirited away in any class by a team-habit of unifying the utterance *on the total team-rhythm.* But the question here is. how is a teacher to secure that this team-habit be established without hurt or loss to individuals? Let us try to examine the facts with a view to arriving at a method, or at least a working basis for a method.

First let the variety and range of material at the disposal of any teacher of teamwork in an average school class be noted.

One child naturally shows more aptitude in rhythm than another. Some children are so quick to show rhythmic gift that their small limbs begin almost to dance in anticipation, before ever the team-rhythm has got under way, before many of the rest of the team are even aware of it. These children are the potential vitalisers and ultimate leaders of the team Some, on the other hand, are so inert as to seem to have no "go" in them at all, at least where a song is concerned. These are the particular charge or care or burden of the galvanisers. They have "go". It can be developed. But it is at a minimum In general it may be laid down that in any class of 25 there will actually be 25 different degrees of rhythmic gift or zest. But will a simple addition sum of all the individual rhythms give what is called the team-rhythm? No.

Addition is manifestly a wholly different process here from an ordinary addition sum. You can add *things* to *things* in a way in which you cannot add *energies* to *energies* Add 25 things, e.g., of different weight or size, and your result may be truly called the total of their weight and size. You get an aggregate that can be seen or handled. Add, however, 25 efforts of different degrees of energy in a singing team, and your result may in some ways actually produce less than the single effort of one of the 25. Thus, if you were to rope 25 boys in a line, and bid them start a race, the boy of the finest energy would manifestly get to the goal better if he were unroped and unhampered, than he would as part of a team So with singing. Start a team of singers together on a song and your team-rhythm will be something composite, quite different, and in some obvious ways less than the best single-rhythm in the team. Put in another way, the only way in which it would seem possible to

[1] The term *rhythm* is here used for convenience (rather reluctantly) in its narrowed sense as applied to note-values and their recurrences *in time.*

make an ordinary addition sum of *energies*, may be compared not to the race, from a given point, of the team roped together, but to a relay race. You can, as it were, add children's musical energy for what it would be worth *long-ways*, adding A's best single effort on the musical course to poor little B's single effort which follows Though B cannot match A's stride that went before him, or C's stride that follows after him, yet he at least would have his turn to contribute what he can to the sum-effort. But obviously this is quite hopeless for our purpose, not at all the kind of addition sum we want in chorus work. It suggests, in fact, not team-song, but a series of solo-efforts of varying energy. The result would be erratic, wayward, as crazy as a crazy pavement. No. Total team-rhythm in music, all starting together and all pulling together, is a reality; perhaps it can be one of the most terrific realities in human experience. But it is no relay race. It is necessary that all start together and all arrive together, and all acquire their strength and pleasure by keeping together all the way And it is obvious that in true team-rhythm, though A, the record-breaker in rhythmic zest and efficiency, is hampered and held back by Z, the rhythmic *dud* of the class, yet B, C, D . . . Y, and even Z, the dud, are all the reverse of hampered, i e they are all helped and spurred on by the *contagion* of A's powers So, though a *broad-ways* roping and a *broad-ways* start may seem to give a picture of an ineffectual scattering, strain and confusion among the unit-efforts of the team, and though a *long-ways* roping and a *long-ways* pull may give another picture of massed energy, in which every tiny degree of effort will count in the sum of team-pull, the truth is presented by neither the one picture nor the other. The broad-ways picture does, in fact, give a vivid if incomplete idea of the music-teacher's normal difficulties in the attainment of efficient unity in musical teamwork, and the long-ways picture gives an equally vivid but equally incomplete idea of his normal assets, of the terrific factors in his favour,—a picture of unity in contributory effort which, if he can convey it completely to his class, imperfect as it is, will be so contagious as soon to prove thrillingly productive of inspiring effort on the part of all. "A long pull and a strong pull" is a good singing team-maxim, and brings results But the truth is,—a spatial picture in three space-dimensions of a musical event or effort is bound to be as imperfect as any material picture of a spiritual happening

It seems essential for any teacher to realise that teamwork in music is an elementary spiritual happening Its perfecting will depend ultimately not upon the spirits of the children, but upon the spirit of the team The high spirits of the one child, the poor spirits of another, must from the first and all the way be drawn together by the team-spirit. It is elusive, at first perhaps hard to secure, but it is the one thing needful of which teachers and taught must be aware, and for which they must assuredly labour till it comes. This seems the chief practical reality of teamwork. A team with only individual spirits to animate it is still only a rabble that may somehow and some day become a team; and the absence of the team-spirit spells grim failure to the smallest singing-class in the smallest village school as surely as to the Leeds Festival Choir under the most masterful baton. But back comes our all-important question: if this measureless factor is so vital, how can it be secured with our little ones age 7 to 11 plus?

At this point it will be well for a moment to take stock of a very human substitute for the team-spirit and for that part of it which we are now specially considering, the team-rhythm. It is as common as it is human for choirs to substitute individual *dictatorship* for the team-spirit. It is a short-cut to passable results, a rough and ready way of co-ordinating the team. You say to all but one of the class, i e. to all from B to Z, "Sing *with* A" You make A dictator. The rhythm of A is set up as paramount, and the rest of the team must adopt it as theirs, and therefore suppress any initiative or inner urge they may feel, in favour of A's initiative, whatever its quality.

But that inner urge in B, C, D, . . . to Z *is* the team-spirit working like leaven from the first in all the limbs of the team-body. It must at no point and in no way be suppressed. And a little thought will show that this personal-dictatorship method is in truth the very antithesis of the team-spirit method. Singing in the one is a process of perpetual suppression and of learning to obey a *beat outside* you. Singing in the other is a process of perpetual discovery and expansion and obedience to a beat *inside* you.

The "Prussianist" or materialist reply to this is that the one is "practical politics" and the other is not. But yet while the material-practical mind tells us one thing, the ideal-practical definitely proves it to be otherwise. How and where to make the spirit of the team the clear and dominant reality which it is, and how to secure its general acceptance in our schools—that is the question. Let us now consider this as eagerly, practically and closely as we can.

Strangely enough (and yet perhaps in a profounder way, *not* strangely) you hear the most convincing examples of it among children themselves, untaught, and by chance. A very curious and recurrent phenomenon of the kind among children may often be heard which well exemplifies it at school concerts, when extra hearty applause sets in. You may hear the clapping, after a moment of uncertainty, settle down into a spontaneous, palpable and *absolute* team-rhythm. True it is only a rough and ready basic rhythm, like that of a pendulum set at its natural swing. There is seldom any spontaneous rhythmic pattern in it such as

though the writer has heard this kind emerge spontaneously too.

This chance manifestation of unpractised team-rhythm deserves close thought. If the clapping remains entirely unpatterned

(♩ ♩ ♩ ♩ etc.)

we have an indication of the very first factor in musical teamwork,—the emergence of a heart-beat resembling clock-ticks. If a teacher is teaching a song such as "John Peel" to a class aged 8 to 9 and is bent upon releasing the team-spirit *from the first*, he would probably find it a fitting step to let the class *say* the words—

"Do you ken John Peel
At the break of day"

in a team-way all together, clapping their hands hard in their own way (without any beat given) at the three words "ken John Peel," and again at the three words "break of day". It would be necessary to let them do this many times till the high *spirits* of the children revealed the actual *spirit* and rhythm of the team. The only things you would need to see to, *qua* teacher (i.e. releaser), would be that nothing was allowed to quench individual spirits in the process, and that they were all naturally bent upon discovering the secret of *keeping together* which is the open team-secret of "give and take." With these two provisos, probably the real thing would arrive in as few seconds and as spontaneously as the accidental team-rhythm in the clapping of hands at a school concert just described. It is possible that a thoughtful reader may here begin to doubt. Someone may well say that unless the rhythm was first put into their heads

by someone it would be idle to wait for the discovery by the children of their own team-rhythm, or, still worse, that they would discover some different speech-rhythm such as:

and then the unnecessary problem of obliterating one rhythm (the children's own) and setting up another (the song-rhythm) would be raised. It would seem that the reply to these fears is twofold. First the children's natural and unconscious artistry in its most rudimentary stages would be almost certain to compel them to answer their own first three claps on the words ken John Peel with three claps *to match* on the next three words, break of day. In fact it is hard to stop them in the very primitive stages from repeating the same pattern many more times than twice when it is set up and set going. The second part of the reply is that the very same artistry (conscious or unconscious) is at work *in the purveyor of the song* as in the children themselves, and the mind of the composer is therefore of necessity at one with the mind of the team. If not, there's something wrong somewhere. The song is either wrongly chosen, or the words are wrongly set (alas—how often we have to discover "out of the mouth of babes" that a poor, silly song-composer has forgotten his twofold obligations, and perhaps forced *round* words into a preconceived *square* tune!).[1]

When the basic throb of the team

has been discovered, has indeed discovered itself, in the mind and being of the children (whether on words, or by clapping, or on a set note G, or by all three methods) then there is nothing easier than to fit on the trimmings of the rhythmic phrases which make up the song

and in this way new rhythmic patterns begin easily to emerge. A child's natural delight in patterns will also emerge, and an interesting second stage is reached The so-called basic throb of the song continues to hold the team. It is in all members of the team in varying degrees. Those who are not quite in its grip will with each repetition

(etc., etc.)

become more and more obedient to it. Those who seized it quickly (or are seized by it) will have started to crave for variety in patterns. For this reason it is vitally necessary in all class work to have both primal and secondary interests going at the same time. In true teamwork there must be variety, while basic unity is maintained. With the slow-minded in the team, detailed interest and consequently detailed perfecting will not be possible. They will still be detained, perhaps consciously, by the basic business which with the quick-

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As a moment's thought will show, the average minds in any class are not the class-teacher's chief difficulty, nor are they his chief care. His result, on the contrary, will come by and through successful mobilisation of his brilliant and his duller scholars, in short, from his extremes. An average-minded output in music is not practical politics. An average song, taken at an average speed, in an average tone of voice, an out-and-out average affair is deadly, a musical fatality, because it spells both boredom to the imaginative minds and strain to the dullards. Working in obedience to an average dictatorship imperils the whole thing. The team-spirit, when once evinced and established, is essentially neither average nor personal, but extremely impersonal. Yet paradoxically its success depends upon the fullest and most natural personal contributions.

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minded has become almost automatic *though still there*, vital to their act of song, *unchanged* in nature and therefore animating all their detail, though becoming by degrees a mere mental background which gives them no trouble. Between the very quick-minded children, who are revelling in variety of detail, and the slow-minded, who are still busy enjoying the mere experience of

or at best ,

there are the infinite varieties of mental workings among the average minds, and round about the average, which are able, sooner or later, to enter into full experience of the song, i.e. *their* full experience, not that of some other person.

From all this it seems to become clear that the teacher of team-singing or playing has a twofold task that does not vary.

(1) He has at all costs to encourage the team-spirit and make the team-habit of a listening give-and-take a *sine qua non* with all his classes, and *with every individual* in the class.

(2) When the team-spirit is thus established among quick and slow alike, when it is the recognised thing, the teacher has still perpetually to be watchful lest any in the class should be working at either less or more than their natural powers of enjoyment and absorption. If they are, either boredom or strain will undermine the team-spirit.

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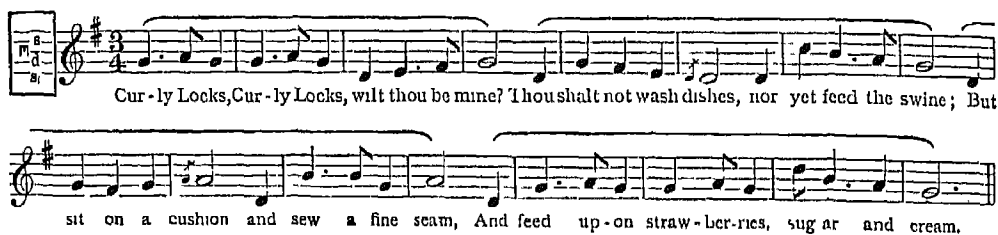
Let us now imagine that one and the same teacher has two classes upon which to experiment. He or she decides to try the two methods here differentiated, on the working theory that one is to be a personal and the other an impersonal method. Let it be a lady teacher, because she will have a treble voice like the children's, so in the case of the personal-leadership method, she will have every advantage of teaching by dictatorship herself; and in the case of the impersonal method she will more readily test how far it is a deprivation and how far an advantage to a leader to refrain from personal assistance.

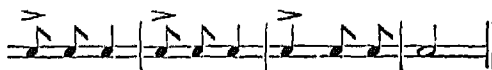
For convenience let there be 26 children in each class and, to use conveniently descriptive symbols, let us call the teacher A, and the children of the first class *a1*, *a2*, *a3* . . . to *a26*, and the children of the second class *a*, *b*, *c*, . . . to *z*; of these let *a1* and *a* be the quickest-minded children in each class respectively and *a26* and *z* the slowest, the others possessing graded ability between these extremes Imagine the following is the song to be taught to both classes at any given lesson.—

CURLY LOCKS.

As dictator, A would teach all the little dictatees (*a1* to *a26*) as an autocrat should, by laying down the time and by sheer domination insisting that all should keep with her in every accent, and in the varying lengths and strengths of every syllable. She would show them "how it ought to go." They would try to sing with and imitate her at every point, if they did their duty as laid down, and she would be their grand prop whenever they went astray. At best their toning and tuning and timing would be hers, and if she were a first-rate exemplar, they would, according to their powers of assimilation (and speed of assimilation), achieve (in its kind) what may be called a second-hand first-rateness

Here we picture a method of *teaching by imitation* at the initiative of a leader. The next logical method of development would be to train a leader or leaders from among the class, using first *a1* as dictator and all the others as dictatees This method of team-singing and team-behaviour is, in our hasty civilisation, too well-known It gets its own quick and generally rough but sure results. For example, the chief members of church and chapel choirs stand too often in the relation of dictators to followers, especially where there is little rehearsal; and the choir as a whole stand in the same relation of dictator to the congregation as a whole, who remain dictatees In precisely the same way school music can be and is taught and conducted at many schools from one year's end to another. The reference to it in our imaginary teachers' conversation at the outset is true to fact. It must be admitted that where leadership is capable, masterful and enjoyable it would get very probably quicker results than the other method Moreover, if the added plan of gradually withdrawing leaders be adopted, and the burden of dictatorship be thrown from *a1* to *a2* (then to *a3* and so forth) initiative in the slow minds would be quickened with advantage, and slowly a generation of leaders would be reared, but still on the pattern of their first exemplar. As all gradually became leaders, the drawbacks of the defective system would gradually lessen, indeed the team-spirit itself probably would emerge and actually transform the method.

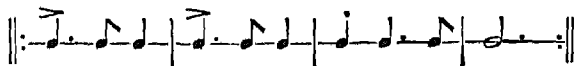
Let the other method now be considered, that of personal obedience to the team-spirit. This time the teacher will not lead, but join in only as member. Though doubtless she would be the most watchful, helpful, alert member, still her whole aim would be to act as *one of a team*. A little republic with complete give-and-take as the axiom and perpetual basis of all that is done, is straightway begun. The teacher will perhaps start operations by inviting the team to say the first line together in a rhythmic manner:—

"Curly Locks, Curly Locks, wilt thou be mine?"

As they do so, out of a momentary confusion (natural to any first unstudied team-utterance in which ten little minds of different speeds of thought or imaginative effort speak together) there will very quickly emerge a result, with certain rough team-accents and team-lengths of syllables,—possibly unifying in some such natural speech-rhythm as the following:

When the teacher notices (as here) that the speech-rhythm into which the team drops is in detail different from the set rhythm of the song

discussion and experiment will arise. The discrepancies may be due either to some actual miscalculation in the music (in any clear case of this such a song should be avoided); or it may be due to the short measure or even slovenliness of the team's customary colloquial speech. The teacher will then lead the class to see how lovely it can be to dwell upon the chief syllable of *cur*-ly locks, and at once the musical rhythm would emerge:

cur - ly locks, cur - ly locks.

Next the teacher might easily get one or more of the children to say the words "*wilt thou*" with the greatest earnestness of an imagined lover. The complete rhythm of the song would then need but a few repetitions to seize the whole team

tending to unify the utterance on this precise rhythm. In another minute or so they would naturally enjoy and completely master the melodic inflection.

Similarly with the rest of the song, line by line, the team would stabilise their output by first speaking each line together, then dwelling on this or that syllable in such a way as to discover the musical rhythm, and thirdly adding the inflections, phrase by phrase, in natural lengths, according to the age and advance of the team.—

From first to last all the ten children should be expected to contribute to the clearness of the team-speech, team-rhythm and team-inflection. Some, being quicker than others, will naturally have secured all three before the rest. As every teacher knows, when once a child has reached its goal, it is likely to be restless, troublesome, waiting for a new job. How then are the bright members of the team to be kept absorbed in teamwork? Fortunately there are, even in a simple melody like this, so many details to be perfected, so much natural difficulty in getting each phrase toned, tuned, shaded and blended,—or as we say in one word, getting the song perfectly *phrased*—that not the cleverest children can have a dull time, provided they are kept upon the track of enjoying interesting details, while the dullards of the team are still being galvanised by team-repetitions. From all this, two very important reflections emerge:

(1) Were it not for the very endlessness of the ways of enjoying the process of perfecting a song, teamwork of the kind here described might be quite impracticable.
(2) Were it not that excellence itself and the love of excellence are in themselves contagious as between those children of keenly active imaginativeness and those who are at first only passively responsive, teamwork of this kind would again prove an impossibility. In all cases where a team is released and happily at work, one child has one good quality to contribute (such as tone or power or clear diction), another child has another quality. And these excellences are contagious. So the spirit of leadership really emerges in a variety of ways out of a thorough team-practice, just as surely as team-perfection seems possible by the leadership method, always provided that all are given turns at leading.

Here the reader may well ask, "Do not the same teacher's two methods with her two classes merge into each other naturally? Does it not almost seem immaterial whether she begins as a dictator A, and trains all the little ones (from *a1* to *a26*) to be like her, or whether she begins by mobilising team-utterance in the rough, then gradually by experiment, discovery and discussion (under the eternal axiom and team-habit of give-and-take) letting all, from *a* to *z* help to mould each other into agreed unity?" The reply to this, and to all such crucial questions in this imperfect world, has provokingly to be "Yes and no"

To a teacher who loves her team as herself, it may prove entirely immaterial which end she starts. So long as release of the team's own happy spirit is her aim, she can be guided by circumstances. But where there is danger of failure to release the children's full energies, and particularly where a teacher is either far *more* gifted or, as sometimes happens, far *less* naturally gifted musically than some or all of the taught, then it is urgent that the team-method should be patiently pursued. Indeed, in any case it seems clear that the natural order of events will be (1) the release at the earliest possible moment of the whole team's activity, and (2) the systematic fostering of improvement within the team, *through individual*

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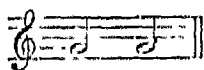
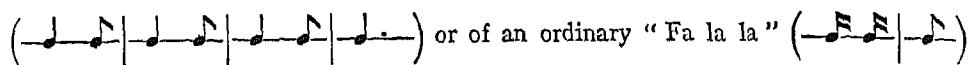
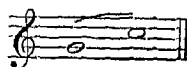
contagion towards excellence. This spells itself out in practice in the general twofold maxim:—*Unify the team by releasing the individual.*

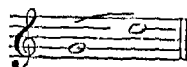
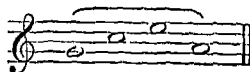
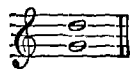
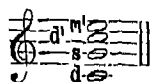
We are now brought back to the specific team-factor that seems to tell most of all,—Rhythm. The thing that most unifies the team is riding upon natural team-rhythms. The thing that will release the individual is therefore the very opposite of the thing known as individualism, i.e. going one's own way. Members of all teams in this world, perhaps most of all the musical teams, are to be released into *the utmost "give" and the utmost "take"* of which they are possible. This common rule of give-and-take is immutable. But the dictatorship conception of give-and-take is one thing, the team conception is another. In the dictator scheme, the dictator is the best man, and the best man takes the lead, while the dictatees do all the giving. In the team conception, it is exactly the other way round. The best man literally does most of the giving, including what is called "giving way." That makes all the difference.

The choir led by a leader on the dictator-principle can usually be detected in an instant. The rank and file are not with the leader, but *follow* perceptibly, deferentially, after the dictator, and the team is "at two" instead of "at one,"—palpably *not a team,* being without the first condition of teamwork. The choir that is a team has all the fun and excitement of habitual and unanimous giving-and-taking. They can be detected by their oneness. Though they never attain that oneness to perfection, they are actuated by it at every point, so they are never "at two," but always "at one." They get nearly perfect oneness precisely because they never expect quite perfect oneness. And the factor that *atones* or attunes them beyond all other factors is that of team-rhythm in conception and deed. Is it possibly true that in practice the smallest children seem to know this the best? It is certainly true that the teacher who succeeds best in practice is the one who inculcates the team-habit from first to last, and above all inculcates team-sensitiveness to Rhythm.

IV. ON RELATING NOTES IN MELODIC INTERVALS AND PHRASES AND IN HARMONIC INTERVALS AND CHORDS

MUSIC itself, of course, depends for its very existence upon the relating of tones. Our power to enjoy or teach it depends upon our power to hear these relatings. When two notes succeed each other thus.

they are not *related* tones; they are *identical* tones, and neither melody nor harmony in the musical sense has begun. Even if two notes are actually different, but if the listener (teacher or child) can recognise no difference in pitch between them when sounded, then music has not begun for them The two notes, it is true, may start a little *rhythm* in the mind, as does the *toot-toot* of a steam whistle given by engine drivers, or the *rat-tat* of the postman's knock. Rhythm may have begun, to teacher and child alike, long before melody has begun. And,

speaking generally, rhythm before melody is a practical and probable order of events in every way. Lay down, for example, the bare rhythm of "Girls and boys come out to play," ( ) or of an ordinary "Fa la la" ( ) and the purely musical interest can the more surely and quickly become an added and desired enjoyment. But the power of the child-mind to enjoy or understand the simplest music actually begins with the recognition of distinction in pitch between tones. It is hardly correct to say that it begins even then. It is ready to begin. Take an analogous case. If a child were being taught about play-acting, the mere distinguishing between the persons or characters, as they enter the stage or speak, would be a *sine qua non*; even the very slow-minded children would be expected to do that for themselves. The real beginning is made when the intelligent relating of the persons in the story begins, as when a child might say, "That's little Red Riding Hood's *mother*." In exactly the same way, only on a tiny scale, music really begins when the child not only hears difference of pitch between any two distinct notes (say G and C):

but begins to discover and enjoy and be able to reproduce the naturally discernible relation between them. Let us look more closely into this.

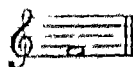
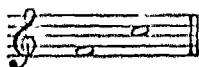
When any two notes are sensibly related in succession, e.g.

they make a melodic interval; when three or more notes are so related, thus:

they make a melodic phrase. Again when two notes are related *in combination*, that is when they are sounded simultaneously and not in procession,

they make a harmonic interval; and harmonic intervals lead to chords; for when three or more notes in sensible relation to one another are sounded simultaneously they make that remarkable and really exciting mental experience called a chord:

The four momentous things in music just described (viz., melodic intervals, harmonic intervals, melodic phrases, chords) are all of one kind. The rhythms in which they may be presented to the ear are of quite another kind. This distinction is very important to the child from the first. It is probable that the relating of tones (in intervals, phrases and chords) remains for a long while, possibly for life, a more or less unconscious thing with

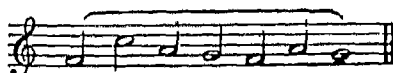
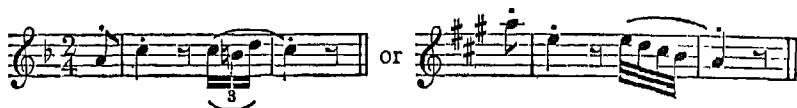
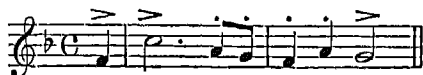
most children, like the matching of colours and hues in a dress or a bowl of flowers. But if music is to be taught, its essentials must be grasped, as must those of any other subject, and it soon becomes a great delight even to small children to recognise, distinguish and use intervals for their own purposes. This is highly important to the teacher. For in the purposeful exercise of this faculty of tonal recognition and distinction, together with the delight it brings the child, lie the main uses of music as a lovely and lovable school subject.

In this section then, we have carefully to distinguish and separate the relating of tones from questions of rhythm, and indeed from all else in a musical transaction; though it should all along be remembered that the way in which tones are in practice related and dwelt upon by the mind, the way in which the mind perhaps lingers over deep or lovely relatings and then speeds over an obvious one, actually determines and makes the total rhythm itself

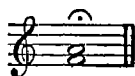
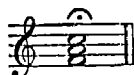
It is, perhaps, serviceably near the working truth of our subject to say that relating tones is the thoughtful part of music, while Rhythm is the behaviour of the thought; and it is with the musical thinking, rather than with the musical behaviour, that we are for the moment concerned.

Before proceeding, let us distinguish between a *noise*, a *tone* and a *note*. A noise is unclear sound. Directly any sound of the kind we call a noise shows recognisable quality, we say it begins to have tone. Then when a tone has recognisable pitch or vibration-frequency we call it a note. A good story is told of Haydn (and probably of many other musicians) which may or may not be apocryphal: when directing someone to a friend's house, he said, "You'll easily find it, because the door-scraper scrapes G!"

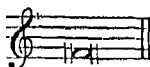
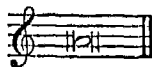
Now let us imagine that to us or to our scholars a noise has given place to a tone, and that a tone has become a note, say, e.g.,

and we recognise and name its pitch, F. What then? We can begin to make purposeful use of this note by thinking of it as a chief note (or keynote) in our minds, and we can begin at once to seek other notes that we can relate to this, our chief note. Indeed, it can safely be laid down that given but one note to think about, the musical mind tends unconsciously to enthrone it as chief till another arrives, and when a new one arrives, an instant process of relating is unconsciously or consciously set up, and so the first step in melody has been taken, viz., a melodic interval, that is, a step to any related or relatable note, as e.g.,

The moment such an interval is succeeded by another, a second momentous step has been taken and a melodic phrase has begun, e.g.,

and this may continue, interval by interval, for any enjoyable length of time:

Such a melodic phrase or series of intervals as the above can only make musical sense when it traverses tones which are sensibly relatable to the mind's starting point, and it cannot reasonably go on beyond the child's power or mental grasp. Many a piece of music is rendered unintelligible and unuseful by meandering. Beethoven was the outstanding master of the short, serviceable phrase. Any child can understand such terse, clear subjects as his almost always are, as for example

Directly any such phrase is so *rhythmed* (to coin a word) as to give and show its intention,[1] directly point and purpose are given to its various intervals, it is ready to become a living phrase or limb of any purposeful tune. The few notes strung together in the above example might well in practice be sung or played thus:

and so come alive to many a hearer who would but listlessly hear it in mere semibreves. Still, of course, the essentially musical part of this small transaction remains the actual relating of the various tones with one another, interval by interval, into an intelligible and purposeful musical phrase, and for primal enjoyment of this essential part, the melodic intervals and the melodic phrase must obviously be such as make sense to a child's mind. In this way to relate notes in succession pleasingly, simply and sensibly becomes the very beginning of music itself

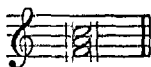
We must now note the corresponding first steps to a chord. Begin by taking any pleasant harmonic interval, such as:

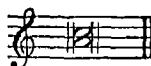
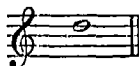
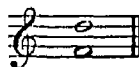
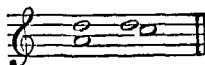
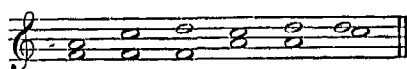
Then, when one harmonic interval is combined with another harmonic interval, e g., when the following interval (called a third)

is sounded with the previous one (called a fifth) the result at once is a three-note chord, in this case a major common chord

or to give it its useful, significant old name, a *triad* If the teacher tries for himself the game of adding one pleasant harmonic interval to another in order to make chords, it will soon become clear that not all good intervals combine to make good chords. Why is this?

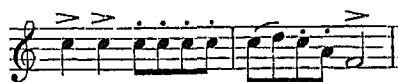
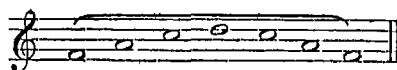
[1] Intention, significance, meaning, purpose, and many other such words may be used to convey the exercise of the faculty of choice in melody.

Here, both in a melodic phrase and (still more) in a chord, an altogether new musical factor comes into view which needs to be most carefully noted by the teacher. It is perhaps best put in a parable. An *interval* (as it is queerly called) is the perceived musical relation of any *two* different tones. This relation, like blood-relationships among men, may be near or remote Let us pretend for a moment that notes are persons. Let us suppose a man F

invites some relation of his A

to sit down with him at table

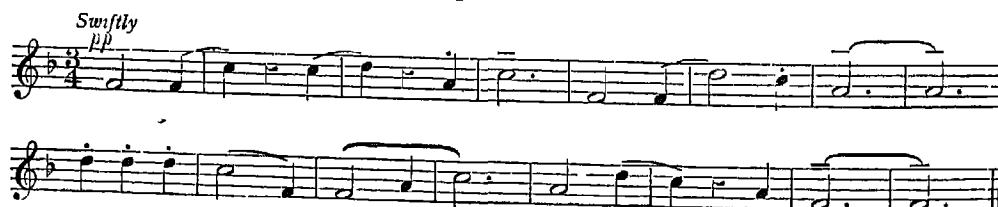
We are then only concerned for the moment to observe, and perhaps to enjoy noting with ear and mind their compatibility, their friendly relations with each other.

But suppose the first man F invites another relation C to dinner as well:

We, as observers, are now not only interested in the host's relationship with this newcomer

but also with the relationship instantly set up between the two guests:

They may both be compatible with their host, and yet unfriendly or dissonant with each other (though in this case they are not). Further, if a third guest D arrives:

he will, on arrival, bring no less than *three new relationships* instantly into play within the party, viz, his friendship (or otherwise) for the original host

and for his two fellow-guests as well:

So even this comparatively simple chord of four notes involves us, as thoughtful observers, in no less than six relationships or intervals:—

Furthermore, it is well to notice that not only does any *four-note* chord

always involve *six* interesting and observable relationships, as when four people exist together round a table, but the same is true of any *melodic* phrase built on similar four-note schemes Such a melodic phrase will also involve (to most music-lovers quite unawares) six interesting individual relationships too. Or, indeed, if you count every upward melodic interval and every downward one as distinct from each other, you will, in this same four-note chord, find no less than twelve melodic intervals related and under your command, to say nothing of your power to add interest to the twelve leaps or steps by standing still and repeating any particular note any number of times *before* you leap or step on, as e g.,

It is easy to make a simple melodic phrase by passing merely up and down through the above four-note chord:—

And here is the same, uttered with varied rhythmic significances, chosen at random:—

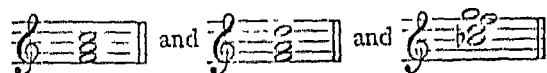
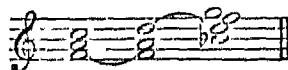
But supposing you are teaching a class that is capable of interest in *all* the twelve possible relationships between the four guests sitting together at our imaginary harmonic table

what charming melodic phrases or relatings, or discourses between the four people such a class could easily devise! Here for example is but one.—

The above does nothing but explore and dwell upon the relationships that exist round the table of the four friends, and of these it uses eleven out of the possible twelve

It is, of course, neither necessary nor usual to construct a whole tune on one chord. Nor indeed can it be considered for a single moment as desirable so to clip the melodists' wings. The simpler the chord, the more disastrous would it be to try to construct simple melody upon it alone. To see this the more clearly, take the rhythm of the above tune, and move up and down the mere notes of the common major chord of F in that rhythm.—

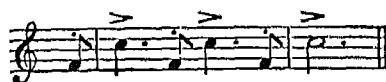
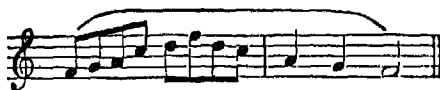
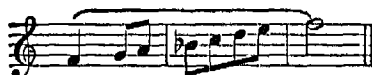
and the result, though euphonious, is surely what one may term rather weak in the head! It has the effect of being held by mental tether to a very small portion of a luxurious pasture-land. Try now the effect of being given a longer, more varied range; though still tethered:—

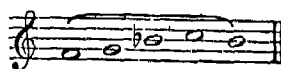
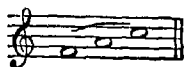
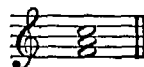
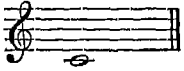
Here we are allowed to explore the relatings of six of the natural notes of the scale in other groups and the result is that other chords or groups of relations come into our minds; to revert to the guest-table parable, we can now discover at least three friendly groups in this tune:

and and

Are they dining at separate tables? Not quite; for we find them inseparably linked up:—

It is hoped that the above will suffice to illustrate to the intending teacher of small children how vast and how secure a range of melody is at their disposal with the simplest possible musical material. A few thought-out relationships of tones and there is no end to the variety of simple tunes within a child's or a teacher's grasp.

MELODY AND SCALES

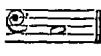
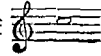
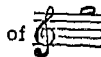
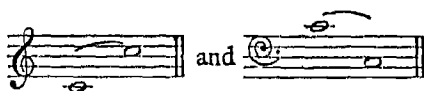
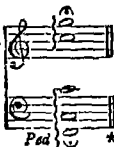
Remembering the inseparability in practice of rhythm from melody and of melody from chords, or rather from chordal conceptions, in all our musical experiences, we shall yet for every

practical reason often find it well in studying melody, to exclude the consideration both of rhythm and of chords. For lessons to teams of young children must needs be chiefly concerned with simple melody, and simple melody will be built not necessarily on one or more chords but on what we call scales of tones, well and truly related to any given starting point or keynote. True, at every single lesson of the fifty-four sketched in this section it is assumed that melody will be rhythmically taught; that in even the least fragment of teaching given on specific musical relatings—whether on mere intervals:

or such scales as the pentatonic:

or the natural scale:

rhythms vitally fitting to the child-mind will be the vehicles. By comparison with the above, the following rhythmless presentation of the very same relations:

will probably seem as dull as it is needless, and to be avoided with young children. To the teacher, however, such rhythmless, naked musical relating of bare melodic intervals and scales and the study of them is a great gain, if not indeed a vital necessity Only, in the process, let it be carefully remembered that even the distinction noted above between a melodic and a harmonic interval is, after all, only a distinction between two related sounds that are sounded one after another and two sounded together. Let it also be remembered that melody could and did suffice in a marvellous country like Greece, and for a period of long centuries, not only without chords but possibly without any chordal conceptions ever maturing in practice or in popularity; and that to this day some so-called modal melodies seem to hold chord-thoughts at arm's length. For example, this phrase in a well-known Gregorian tone:

seems so wholly satisfying as played or sung that one is inclined to cry out "Hands off, harmonist!" On the other hand, it all along remains true that this melodic concept:

and this harmonic one:

have fundamentally a helpful oneness, what is called an arpeggio or spread chord eloquently testifies to this

And in actual practice the simple and familiar chords can help a child to make melody the more confidently, while melodic experience can help it gently and naturally to enjoy more chord experiences later on.

For greater thoroughness, attempt may now be made to trace the evolution and probable origins of the simple scales of to-day, from their very source. In this way it is hoped the stages of child-tuition may be made both easier to apply, and simpler to teachers with but little time to read treatises on the subject. The whole of the next section can be omitted by those readers who prefer to take the scales in use to-day ready-made and for granted.

TRACING EUPHONIES WHICH, WHEN ASSEMBLED, MAKE THE SCALE

It should first be observed that the octave is the most perfect interval in music. Every tone in the universe is nearest related to the two tones which lie respectively an octave above it and an octave below it. Take any note, e.g. middle C and sound the notes an octave from it on each side:—

They are what they are, simply because their vibrations fit exactly in the ratio 1 : 2 or 2 : 1. The next perfect interval in music is necessarily the so-called twelfth (above or below)

with again exactly fitting vibrations, in this case in the ratio of 3 : 1 and 1 : 3 respectively.*

* Thus for every 6 vibrations of middle C there would be 3 of and 12 of also 2 of and 18 of Hence their perfect smoothness of sounding, any note with any or all assembled:—

If we set ourselves to seek only for other just such absolutely perfect intervals as these two, all we can apparently do is to explore the simple ratios 1: 4, 4: 1, 1: 5, 5: 1, 1: 6, 6. 1, etc. etc. In other words, we can only explore two ladders of simple tonal ratios:

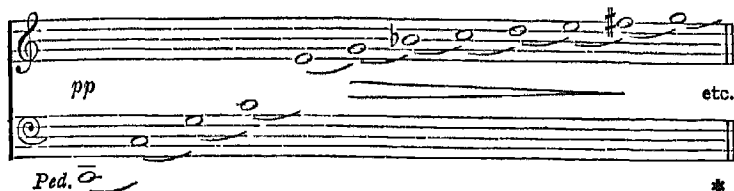
In so doing we shall quickly be brought up against two facts of a very practical order. (1) We shall find our set of intervals sprawling, as it were, right out of all human (vocal or instrumental)-compass. (2) In the case of the second series the lower we go the more we shall find the notes (however modestly sounded and on however sweet an instrument) *generating their own set of harmonics* or "upper partials" as they are called

These two factors set two stern human limits upon lines of musical exploration and choice, limits of a permanent order. They also bring vividly to our notice two important guiding facts· (1) In all natural sounds, *process from one tone (or note) to another tends to be gradual.* This may easily be heard in natural sounds such as the soughing of the wind, or in a human moan of pain, or in cheers on a football field, still more in the croonings of contentment with which mothers lull babies to rest or in which little ones babble back their happiness. Put in another way, natural melodising can move far more easily from any note to its near neighbour-note and back,

than it can jump, for example, the melodic leap of an octave:

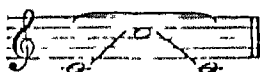
(2) The lowest note of any interval or series of intervals has always in practice the strongest physical pull upon the ear, precisely because there is scarcely ever a note of either voice or musical instrument which does not generate (in very various strengths) some or all of its harmonics in the following constant series:

The significance of these two facts to the music of our day—it seems indeed safe to say to the human music of all time—appears so great and so far reaching that we may well dwell upon them a moment in trying to think out and classify our primal melodic uses and the simple diatonic scales that control them. For through them it becomes clear that, melodically speaking,

a graduated scale (even of comparatively complex ratios) is far more natural to the ear and mind than a sprawling series of simple ratios! On the other hand it is equally clear that however they may sprawl, the natural series of harmonics (that is to say the simplest ratios 1:2, 1:3, 1:4, etc.) sounded all together are, harmonically speaking, an easy, simple and most charming musical experience to every ear. This harmonic experience may easily be tried out by any reader softly with sustaining pedal on any decent pianoforte.—

So from the first, *two* intelligible, natural principles regulating musical enjoyment seem at work, carrying the mind of man in seemingly opposite directions: one (the purely melodic) would make him prefer to relate notes that are very close to each other in actual pitch, while the other (the harmonic) will make him tend (like Chopin) to relate notes that are far from each other in actual pitch but very nearly and purely related in vibration-ratio Our safety as music lovers seems to lie in the frank and firm recognition of the tremendous practical formative force of *both* these natural principles in all our music,—i e. in all human relatings of tones, childish or otherwise.

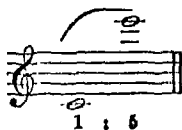
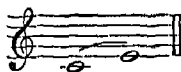
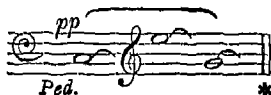
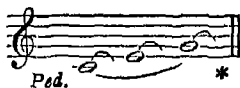
Along one line we are surprised to see that even the complicated chromatic scale:

is in one sense nearer nature because more gradual than the simpler mental transaction called a diatonic scale

and that the Indian classical melodies, making and observing smaller divisions than the semitone, are in their way nearer nature still; while a deliberate and perfect *portamento*

touching an infinite number of points between C and C, if well sung, is nearer still, though it will either wipe out all thought and become a mere sensation, or so fill us with a complexity of vague wonderment and groping conjecture as to make us long for a few definite 'stations' such as a well-related simple scale or chord would give us. A singer's *portamento* is, as we know, not a mental transaction at all, except as regards its stopping points. It is

gradualness *in excelsis*, and it ceases to be musical melody exactly as and when it ceases to be definite. Along this first line of thought we reach with conclusive clearness the musical need for scales. And clearly the intervals involved in such scales must neither be too wide apart to be neighbourly (and physically relatable), nor too near to be distinguishable (and mentally relatable). Furthermore a primal or child's scale must fit a child's melodic power at every stage

Happily enough, along the second or harmonic line of thought we are also quickly brought to a similar conclusion. It is a startling discovery when first one realises that C and G at a distance of a twelfth make a perfect interval:

in the same sense in which the octave is perfect, but that at the distance called a fifth they do not! Further, that a major seventeenth (or major third at a sprawl of more than two octaves distant)

is a perfect interval in the same sense that an octave is perfect, while its counterpart, the simple major third (4 : 5),

so far from being perfect, was for some time barred as a discord! So the major common chord played thus:

(all other things being equal) is far more perfectly lovely to a child's ears, or to ours, than (try as we will) a major chord assembled and played thus:

Yet the latter is far more practical purely as melody. The notes are the same in both cases; but they are in the one case placed as near as they will go to each other for melodic purposes, in the other they are spaced and spread out in nature's own simplest and most euphonious ratios for harmonic enjoyment.

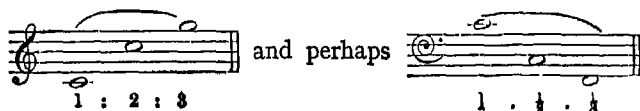
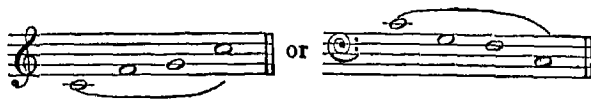
Whither then do both these lines of thought lead us? Surely to the same search for a stability point in all our musical relatings, a stability point which shall reconcile the requisite euphony

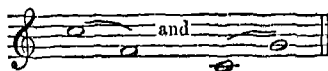
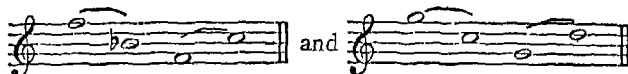
with grace of movement, joining harmoniousness with melodiousness. In both cases we look for a workable scale, and workable intervals, an assembly of related notes that are neither too few and far apart to serve melodic needs, nor too numerous and near for practical needs,—neither too numerous, that is, to be grasped, nor too near to each other to be distinguishable

We may now try to trace in some detail the results to which the ceaseless workings of these two natural principles seem actually to have led us.

In here saying "have led us" instead of "will lead us" we may see that really all along we possess the main, beautiful, centuries-old answer to our enquiry, in the so-called natural scale (the white-note scale on any keyboard and the scale without accidentals or any stave). We are fortunately not in the position of seekers for a practical group of related notes that do not as yet exist, but rather of students who seek to understand from a beginner's angle scales already in their possession. There seems no better way of understanding them than that of setting out, under guidance of our two main principles, to rediscover and test them

It may be imagined that if this world were blotted out, and we found ourselves on another planet among intelligent beings, having forgotten all our earthly tunes and scales, we should still begin afresh with the same, simple, immutable octave:

from whatever tone we started, for we should still have our love of simple euphony to guide us. We should also have our natural love of melodic inflecting among tones adjacent to one another; and with the two, we should then and there (as here) proceed, whether consciously or not, *to assemble our gradually acquired simple euphonies within the workable compass of an octave or thereabouts* In our newly discovered system, we should, of course, get no scale, if the euphony 1 : 2 were the only euphony we could enjoy. But on our new planet should we not stumble, as men did on earth centuries ago, across·

in due time? What is more, our melodic principles would conspire to make us assemble our newly-found tones within the convenient octave·

It is surely scarcely by accident that these discoveries assemble for us the very notes that Elgar penned for Gerontius waking after death in a new world:

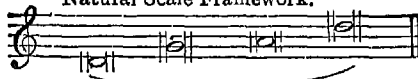
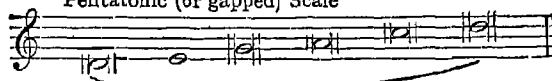
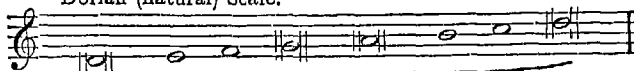
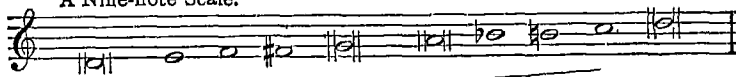
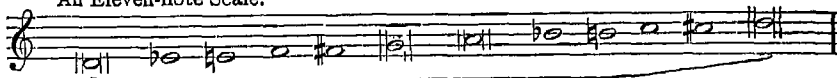
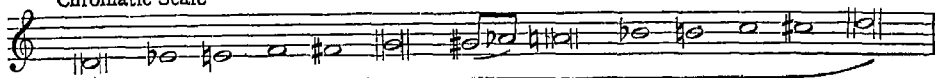
Here, indeed, is a suggestion of a universal framework for any and every scale. But the gaps are, from a melodic point of view, as yet too great Vague voice inflections between C and F and between G and C would leave us soon wearying for a definite, agreed and richer tonal alphabet. And besides, when once we had mastered the juxtaposition of F and G in our assembled euphonics, what reason would remain against filling in by similar means those two inviting gaps? But with what shall they be filled? Well, simply, just as C had given us F and G:

So our newly acquired notes F and G would respectively yield us

and assembling all our newcomers (from two directions, as it were,) under one melodic roof we should acquire a new five-note system.

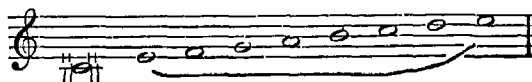
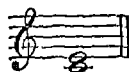
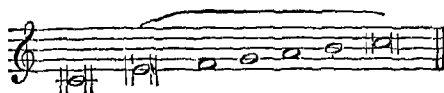
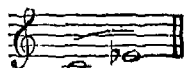
On our new planet with such a scale secured, we should perhaps begin to recall the lost tunes of earth! For it is here worth while to remember Cecil Sharp's *dictum* (uttered with perhaps uniquely vast experience behind it) that all the Folk-tunes of the world seemed to him to conform broadly to this so-called "gapped" or pentatonic scale, with uncertain melodic inflections within the two gaps. The present writer, without making any particular search for tunes in this scale, has, by chance, received them direct from India (Tibet and elsewhere) Africa, America and Central Australia; and of course the story of Robert Burns' advice to the aspiring Scot who wrote "Ye banks and braes" that he should make a tune on the black notes of the keyboard and then he would find "a true Scots Air" is gloriously significant of the fact that when a thing is of sufficient beauty to be the property not so much of the whole world as of the whole universe, it is homely enough for any audacious patriot to claim as the peculiar property, and as exactly the right thing for his own tiny little country!

If we pursue the process of tracking, deriving and assembling the same euphonies from the five notes now obtained, the seven-note scale known as the Dorian mode results. With this in mind it is not surprising that an authority in Wales, Dr. Lloyd Williams, after careful study, has asserted that when a Welsh preacher becomes so moved as to declaim his sermon in fervent melodic inflections* that can be noted, they are constantly found to be "in the Dorian mode." From this seven-note scale—which, be it observed, is but one form of our recurrent natural or white-note scale—the pursuit of the same method derives for us a nine-note scale with but a major and minor third and a major and minor sixth, then an eleven-

* Called in Wales *Hwyl*

note, and lastly a thirteen-note scale Here is the complete series, taking the note D (for convenience) as a starting point:—

Natural Scale Framework.

Pentatonic (or gapped) Scale

Dorian (natural) Scale.

A Nine-note Scale.

An Eleven-note Scale.

Chromatic Scale

It is not to be thought that this our imaginary process of re-discovery necessarily coincides with the historic process of discovery of the chromatic scale as handed down to us Given the melodic and euphonic intuitions, there are many ways along which the same scales could have been reached. All roads lead to Rome, and all melodic and euphonic roads seem to lead to our present system of so-called diatonic, chromatic and enharmonic melody and harmony. To glance along but one other road, suppose some slightly more advanced student had ventured into higher euphonics and built his scale upon the fourth, fifth and sixth natural harmonics of a given note assembled as they are within the octave.

Measure the two simplest ratios from each of *these* three notes, and lo! the diatonic scale is again reached, this time as it were at a bound:

Indeed the moment any mind is fully in possession even of the major third as a basic interval·

most of the diatonic scale is his by merely measuring the three simplest euphonics from each of these two tones

Again, given the minor third:

he can as simply and in the same way derive most of the minor scale:

From all this, it will be clear to teachers that the scales we know so well seem simply derived and immutably founded It must also be clear that the simpler natural scales concern us most in teaching children from 8 to 11. The five-note and the seven-note scales are obviously right for their use, for these are simple, yet affording apparently infinite melodic possibilities. But before ruling out from our early studies the more advanced chromatic and enharmonic scales, which for completeness have been shown above, it may be well to note that the last of the scales, with its enharmonic duplication of one note has brought music to a point from which men may catch new sight of bafflingly limitless enharmonic development Beethoven and (in an even more remarkable way) Schubert intimated startling lines of development in the subtle relating of familiar tones in unfamiliar and almost unearthly ways, more than a century ago. One example from the *Unfinished Symphony* may be mentioned, as it is likely to be familiar to teachers, and it must suffice as a pioneer indication of the vast unexplored field of enharmonic delight If the reader will glance at the final (thirteen-note) derived scale above, he will find G sharp and A flat are the last notes to arrive, and that they arrive, so to speak, from opposite sides of the Musical Pole These two tones are so nearly identical in sound that Bach and his successors ordained that they should be but one sound with two names in the equal temperament system. The middle black note of three on the keyboard has to stand for them both, though they for ever preserve their separate identity as indicated by their two names. Now if the reader can get a good gramophone record of Schubert's *Unfinished Symphony* and locate the portion of the slow movement at which a protracted and quiet clarinet solo begins first in C sharp minor and later A minor, supported by whispering chords on the strings; and if he turns that portion on over and over again, he

will hear and gradually realise an unforgettably lovely harmonic play round the enharmonic difference between two notes. If the passage be transposed into E minor, the momentous significance to the mind of the thought *G sharp* and the thought *A flat* will be apparent:

A flat takes astonishing possession at the ninth bar, to give place to G sharp again at the close of the long-drawn phrase. It is not fitting to pursue the meaning of this marvellously thoughtful, visionary style of music here, nor to attempt to describe or explain the use it makes of the more familiar relatings of diatonic musical phraseology in order to lead to those fascinating enharmonic regions, unfamiliar yet completely reasonable to the plain man.

Continuation of the question of Relating Notes on the harmonic side will be found in Section VI. 5 below, under the heading of Key and Cadence. Here it seems desirable for practical purposes to break off from these purely musical considerations to examine the bearing of all speech-utterance, but especially of rhythmic speech, upon melody and upon the teaching of it to small children.

V. ON FITTING WORDS TO MUSIC

SPEECH and melody have so much in common that even if they were never to be wedded in a fitting song, they would still have perpetually to learn from each other. Let a child speak poetry in a clear happy manner, and it is halfway to singing it Sing poetry naturally, and it will be hard to speak it badly.

The sound of a phrase in music and the sound of a sentence in words, when uttered, have three common elements These may conveniently be referred to as (1) their long and short, (2) their light and shade, and (3) their rise and fall Put more technically, both the notes in a melodic phrase and the syllables in a spoken sentence work alike in the tonal dimensions of *length* and *strength* and *pitch*

Let us suppose for a moment that we live in a world where poetry has been customary and where melody is also known, but the two have never yet been attempted together. In such a world, the child who uttered the line,

"Hōw dōth thē līttlē būsȳ bēē"

as eight syllables equal in length and strength and pitch, would resemble an automaton; and a child who, told to make up a line of melody, sang as follows:

would be like an automaton too. Both processes would, in an intelligent and happy world, be an artificial impossibility. Here it should be carefully noted that the three elements of utterance in speech and melody, which we have noted as *length*, *strength* and *pitch*, alike acquire all their charm and meaning in both departments by their varieties of *relative* length, *relative* strength and *relative* pitch. Start to recite a book of *Paradise Lost* or to sing a melody of the same terrific magnitude if that were conceivable (i e. with as many notes as the poem has syllables) on one note of unvarying length and strength, and in both speech and melody you would have an unintelligible enormity, an abnegation of sense in either poetry or music

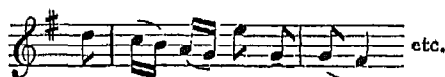
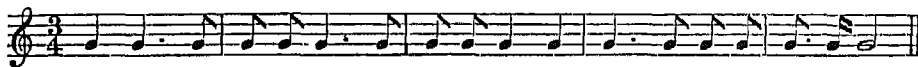
Returning to our specimen single line, let us now imagine that a naturally vivacious child utters the familiar words with enthusiasm. Variety of tonal length, strength and pitch on each syllable would at once result. For example, there would be extra strength or accent on the first syllable of "little", and of "busy", and on "bee". There would be length or quantity on "bee," not only because of its importance as subject, but because of the length of its vowel There would probably be length and strength on both the first words "How doth"; not length of syllable in the word "doth" so much as a curious tendency to lengthen the time taken up by it without dwelling on its vowel. The word "the" would be very short and weak by comparison with the rest of the line, and the first syllables of "little" and "busy" would be shortened in accordance with their short vowels. The more sensible the child, the more we should expect the various values to show. Turning next to the musical equivalent, we shall see how transformed in nature our dull eight notes become if we allow corresponding signs of interest, fancy and vivacity to play if merely into their time values:

And so far we have not considered what might be happening to the rise and fall of tones of voice as the child-mind plays round its subject, or correspondingly to the melodic rise and fall Fantasy follows a million devious vocal tracks in rise and fall, in long and short, and in light and shade. Of two things we may be certain. not one child in a million would leave the syllables unvaried as it moved to the culminating word "bee"; and no two children would follow exactly the same track except by pure coincidence With many children the acute vowel *ee*, and its importance as subject of the whole verse, would carry the speaking voice to a culminating height on the last word. Be that as it may, the instance makes it abundantly clear that even in a world where supposititiously there is no such united art as the art called *song*, but only the two separate arts called poetry and melody, the interest and the charm of both are to be found in the delight of varying related tones, the variations being in all cases those which we know as (1) rise and fall, (2) light and shade, (3) long and short. Compare the melodic values and interest of the first dull line above, with a specimen of eight notes rendered relatively vital in all three ways:

From the above a few important practical points may emerge (1) that apart altogether from the question of combining the two arts for practical purposes in school work, the very factors that make for vital interest in speech will also make for vital interest in melody; (2) that this being so, song seems a most natural alliance of two arts; (3) that it is truly desirable when they are wedded, however much they may give or take,—mutually accommodating or amplifying each other's appeal—that no avoidable contradiction* in their elementary terms should be allowed this is clearly the more desirable when poetry and melody are both school subjects; (4) that when melody and poetry are being pursued as *separate* subjects, they should certainly be used, by reference to and analogy with each other for the purpose of illumining and strengthening each other's claims, (5) that there is a strong similarity of effect, to be frankly acknowledged and acted upon, between the consonants and short vowels in speech on the one hand and of so-called phrasing-marks (dots, lines, accents, slurs) in melody on the other. Perhaps this is the most important practical point of the five

In regard to reflection (3) above, is it bearable that even Arne, the writer of the deliciously fitting song "Where the bee sucks", should ask us to sing Shakespeare's poem which begins

> "Blow, blow, thou winter wind!
> Thou art not so unkind
> As man's ingratitude."

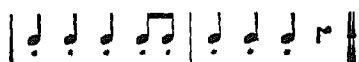
to a suave Haydnesque little tune that begins

Is not Mr. Roger Quilter's recent rhythm to the same words remarkably true to fact?

and could not many a splendid, stirring and biting melody be written on such a rhythm, such as Quilter has written?

Speech-rhythms and music-rhythms have then inherent likeness and problems in common.

NATURE OF SPEECH RHYTHMS

Speech rhythms may be defined as the natural and mostly unconscious rhythmic groups of note values which a speaker makes with his speaking voice in any vital utterance, whether of sentences of prose or lines of poetry. A little child who had been taught the game of

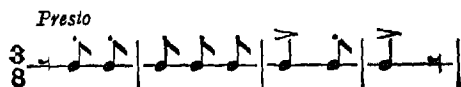
* Tennyson expressed disappointment in settings of his verse which "went up when he wanted them to go down, and down when he wanted them to go up"

rapping out and making its own speech-rhythms once asked that ideally sympathetic teacher, Dr. W. G. Macnaught, to guess what she meant by this rhythm:—

After much trying, and failure to guess, she gave him the answer —

" |Have you been in a |motor bus? " ||

A glance at this childish instance will make two or three essential points clear. For instance, rise and fall, i e. speech inflection is here entirely ignored. In such speech-rhythms we are concerned with only two of the three factors, viz.; *length* and *strength* (or in other words *quantity* and *accent*); together, it is true, with one other immensely significant factor which applies equally to speech-rhythms and music-rhythms, to be noted in a moment. Further, the things that determine speech-rhythms are seen to be of two kinds. These are (1) the thought values thrusting themselves from behind into the speech and (2) the actual shape of the words themselves in utterance.

The first is the main partner and may be considered first. (1) A big mental value, a big "think", or we may dare to call it a big spiritual value behind any particular word will tend to make a speaker unconsciously single out that word or syllable which serves to carry its load of meaning. This singling out may by no means always involve lengthening, or even stressing in volume, the word or syllable that is big with meaning. It is strange to realise that often the greatest value is secured by softening and not by loudening A syllable or word of triumphant import, it is true, may well become higher, louder and longer than all its fellow syllables But should it have a tinge of mystery in its significance, it might easily get an enhanced value by being actually uttered more softly and in a lower tone than any other. This is only to say that the law of contrast is of such significance to us that a sudden *change* of any kind can do even more than a sudden increase of energy in utterance It does not belie the law by which increase in length and strength and heightening in pitch indicate increased pressure of inward interest, it only supplements this law with an additional means of expression by surprise. On the mental or inward side it is equally true that a small negligible "think" behind any syllable or word will tend to make a speaker give little heed or value to it, and pass over it quickly and quietly, perhaps make a demi-semi-quaver of it in his unconscious scale of time-values On this principle, words take their respective places in length and strength in any sentence by the unconscious sorting out of relative *inward* values, and by this means mainly, the shapes of the speech-rhythms are formed. And this impulse of the thought behind the words is undoubtedly the senior partner in the creation of speech-rhythms. Spirit makes its own rhythms in utterance by subtly related spiritual values. (2) But the junior partner in the creation of speech-rhythms is very important too, though its whole case is the just and adequate shaping of the actual words, whatever they appear to mean. "Hă yĕ bĭn ĭn ă" (motor bus) can be said in a far shorter time and on relatively shorter notes than "Have you been in a" (motor bus); and, had these been the customary words, probably Dr. Macnaught's little pupil would have rapped out something like this:

Presto

though the meaning remains unchanged.* The song-writer soon finds out, in course of his perennial labours to reconcile his melodic impulses with his speech-rhythms, that there are at least three separate verbal factors at work to help to determine his quality and accent, over and above, or side by side with, all other factors, verbal or musical, viz., the length of the vowels, the nature of the defining consonants and the natural verbal accent. Thus in the above baby-instance "Have" has not a long vowel, yet apart from all else its initial aspirate and its final consonant *v* take by nature a certain appreciable time to utter. So two such letters *plus* even a short vowel make for a long note on the word "Have". The next word has no consonant except *y* which is merely a consonantal *ee*, but this takes an appreciable time and is followed by a long *ōō*. So, for different reasons, the second word also becomes a long note. Then again "been" has a long *ē* and the tonal final consonant *n* tends to make it a long note. The short vowels in the next two words are a boon to the child on its rhythmic side, for they arrive just in time to give life and interest to the resultant rhythm owing to their shortness, and we are then quite glad to steady ourselves on the initial tonal consonant and the long *ō* of "mō-tor bus". At this point we can turn to the working of the new and important additional factor referred to previously.

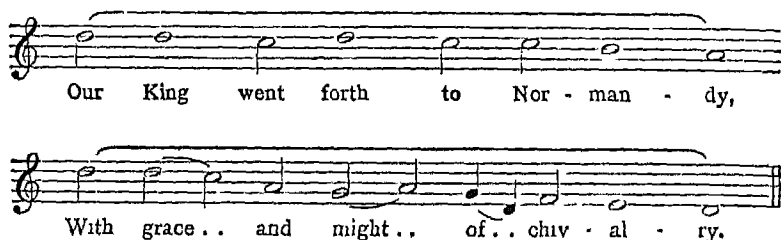
It is to be observed that the child gave half its rhythm to the last three syllables, though two of them have short vowels and no consonants of any depth after the *m* of "motor". It is true that the hiss of the final *s* of "bus" is valuable, though quite un-tonal (nothing but breath). But it will be noticed that the *spacing* of the syllables is the telling thing here, and spacing is the factor referred to above, to be watched by every rhythmician and of immense use in speech and melody. Years ago there was a street song which began:—

The spacing out of the first three syllables was vital to the singer's success. Any sustaining of the notes here for vocal or musical purposes would play havoc with the real rhythm. The rests or silences are an integral part of the thing. It may be noticed that song-writers are extremely apt to leave out the directions to singers to space words with such meanings and shapes as clearly need spacing, so they easily get very disappointing results. Often the sole difference between e.g., Harry Lauder in the front rank and somebody else in the back rank turns upon this subtle but vital matter of spacing words that are slight in build but great in meaning. Just as spacing a word seen on a page will give it prominence and real force to the eye, so giving an uttered word a momentary silence (before it or after it or both) will give it prominence to the listening ear.

To sum up this matter, it is the relative lengths, strengths and pitch both of the speech-syllables in poetry or prose and of the notes in a melody, which always give vitality and interest both to poetry and melody. These relative values are determined, in the case of words, mainly by the spiritual values behind the various syllables. Some syllables may thus become more than others the carriers of meaning. These are singled out unconsciously for greatest attention, and by this means a poet's mind reaches his hearer's mind in all the ever varying subtleties of rhythmic utterance.

Now in the case of pure melody, without words (and without any external ideas such as may be found in drama or in so-called programme music) the rhythms have to be determined entirely *by the inner values given by the melodist* to each note, as he relates it musically to

* The intensely interesting question as to how far outer and verbal abbreviations arise from and react upon inner and spiritual values must not be entered upon here.

that which precedes it and to that which follows it. The form a melody takes, for example, may be settled by the rapturous value a composer like Handel may set on so small a matter as the perfect fourth or a mere diatonic scale It is surely this fact which makes melody itself a veritable barometer of man's mind. Or melody may be likened to a mental journey, a reverie, in which the very *behaviour* or step or gait or gesture of the melodist's mind is relentlessly revealed. It may be put in yet another way. The mind may be seen actually to be training itself to gain freedom of thought, balance of thought, adventure, control, tenacity, clearness, and all other qualities of thinking and imagining which it may deem desirable, by the way in which it makes or chooses melodies that seem by their very movement, choice and treatment of intervals to exemplify freedom, balance, adventure, control, tenacity, clearness, consideration, fitness, and all other lovable and admirable human qualities which give a melody distinction. Hence, possibly, the measureless educative value of simple melody-making whether with or without words, apart altogether from the value of musical study as mere history, as a record of men's ways of thinking down the ages; for, in passing, is it possible to over-estimate the significance of such historic fragments of melody as the following? It was an English product just after the battle of Agincourt·

In such a rhythmic rise and fall, in such euphonies related in just such a way, we at least have one first-hand symptom of the way our fathers thought and behaved vocally after victory, five hundred years back. Here we can to some extent *hear* English History

There is profound difference between speech and melody, between verbal and musical eloquence. They deviate by nature continually, because one sets out to move us through evoking delightful imagery, the other through evoking delightful euphony No one who has tried to set a poem to music can get away from this double pull. Yet in spite of this, their likeness is profound and intimate. Though the rhythm, the rise and fall, the light and shade of the speaking voice seem to be left to chance and temperament, and though in singing they seem to be set out in precise musical terms, both are equally a record of creative values and as such both share the qualities of precision, fancy and temperament. And for these reasons they must ever borrow hints from each other

To make it easier for the teacher to help children to fit their speech and melody naturally and easily in song, it will be well to attempt here a teachers' complete classification of English vowels, aspirates and consonants, as heard both in speech and song.

TABLE OF SOUNDS

Let the teacher take a looking-glass, and watch his or her own mouth carefully while saying the series of vowel sounds represented thus:—

taking care to make the transition from vowel to vowel very gradually, and taking still greater care that there shall be no cessation of sound the whole time It will be seen that the vowel journey is from an open to a closed vowel, with lips at last nearly shut. Then say the word *woo*, and it is the more easily seen why the letter *w* has a dual nature—sometimes vowel and sometimes consonant.

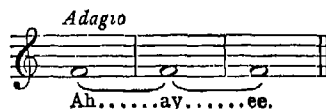
Now start again at the central open vowel *Ah* (at its very openest for choice) and go through the other series:—

Again it is a journey from open to closed vowel tone, but this time closed *back* (and less visibly) in the throat apertures Then say the word *Ye* very vigorously and the dual nature of the letter *y* is also clear,—it too is sometimes vowel, sometimes consonant We can now see that in reality there is an infinite range of vowel sounds in two directions from a central *Ah*, just as in stretching a piece of elastic it attains or passes through an infinite number of different tensions and lengths. Of these numberless vowel shades in England, we can for practical purposes usefully distinguish fifteen, as in the following tabulation from central *Ah* up to extreme *ye*, and down to extreme *woo* This tabulation may be useful to teachers for practically every shade of vowel Variety and naturalness of utterance (in speech and song) are likely to result from such practice.—

TABLE OF VOWELS and their corresponding aspirates

Vowels.	*Examples*	*Aspirates*	*Examples*
y as in	ye	h as in	heel
e ,,	eve†	,, ,,	heel
i ,,	bit	,, ,,	hit
a ,,	late*	,, ,,	hay
e ,,	bet	,, ,,	heaven
a ,,	bat	,, ,,	hat
ah as in	father	,, ,,	harp
ā or ăw as in	all or awl	,, ,,	hall
o as in	lot	,, ,,	hot
o ,,	pole	,, ,,	hole
u ,,	pull	,, ,,	hurrah
u or oo as in	rule or pool	,, ,,	hoop
w as in	woo	,, ,,	whoop

To these for completeness sake must be added the two peculiar and very common modifications of the central *a* sound which are to be found in the *u* in hum, and the *u* in hurt (also in the *ui* in squirt or the *e* in pert). The first of these is very common in weak, short and

† The same as *ee* in fee, *ea* in peat, *ie* in mien, *ei* in receive.
* The same as *ey* in eyot, *ai* in lain, *ei* in feint.

dropped syllables, such as the last syllable of *heaven* (never to be sung as *hĕvĕn*, but rather dropped as *hĕvŭn*)

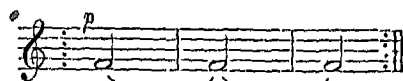
Consonants are always purposeful *obstructions* or special *shapings* of simple vowel sounds or of their corresponding aspirates The obstruction may be total or partial For example, *B* wholly obstructs the vowel by shutting the lips, and so there is an explosion when the obstruction is removed, and by this explosion we know that *B* was the obstructing consonant On the other hand the consonant *V* only partially obstructs the vowel tone, and so we can hear it as an obstructed vowel the whole time,—in short it is possible to sustain such consonants, and to learn to do so is very valuable to the singer In addition to consonants like *B* and *D* and *G* which obstruct tone, and *P*, *T*, *K* which obstruct breath (with lips, tongue or throat respectively), there are three humming consonants, in which the oral obstruction is maintained but humming tone* is resounded into the consonant sound, in the three consonants *M*, *N* and *NG* (as in King).*

All consonants other than the six explodents (as they may be called) *B*, *D*, *G*, *P*, *T*, *K*, and their companion humming consonants *M*, *N*, *NG*, are only partially obstructive, and take their character from the nature or shape of the obstruction, whether made with lips, teeth, tongue or throat.

TABLE OF CONSONANTS

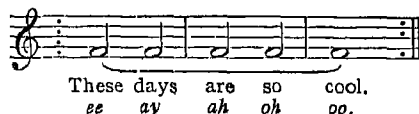
Tonal	*Aspirate*	*Humming*	*Examples for monotone practice*
B	P	M	*B*e *P*repared O *M*an
D	T	N	*D*ine *T*o-*N*ight
G (hard)	K	NG	*A* *G*ood *K*i*NG*
W	WH	—	*W*oo *Wh*om *Wh*en?
V	F	—	*V*ase *F*ull of *F*lowers
TH (soft)	TH (hard)	—	Brea*the* a brea*th*
L	—	—	*L*ow-*L*ying *L*ane
Z (soft S)	S	..	*Z*ephyr *S*oftly *S*ighing
J (really ZH)	SH	—	*J*ohn is *Sh*y
R	R	—	*R*eally *R*ather trying
Y	—	—	*Y*ea, *Y*ea

Note that the English J has a *D* sound before the soft *ZH* Similarly *Q* in England is merely a composite of *K* and *W*; *X* of *K* and *S*, *CH* of *T* and *SH*

It is important to the teacher to notice that in all the so-called tonal consonants, i e , those which are not explodents, the tone that is partially obstructed should be in itself good tone; and so should the humming tone of *M*, *N* and *NG* Children who learn to sustain through tonal and humming consonants have a great advantage in singing, and their diction has all the greater clearness and charm to the listener. If there is one child in a class with this gift in a special degree, others should be taught to imitate it. Such words as

Meaning a meaning all morning.

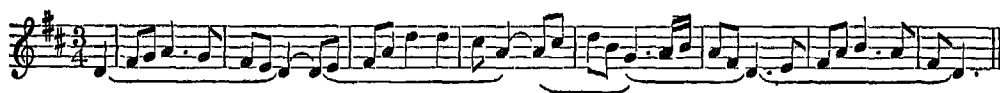
make capital exercises *provided the sustaining of the tone is never once interrupted.*

*Very few people seem aware that they are singing through their noses during the holding of the three consonants *m*, *n* and *ng* Let the reader try, suddenly stopping his nose in the process with finger and thumb

These tables are not suggested for children to learn, but rather for the guidance of the teacher who desires a comprehensive glance at the sounds his pupils will always have to make in the course of singing or reciting English Short exercising sentences should be made up for intoning, covering any difficulty which presents itself to any particular class or pupil at any time. The writer remembers one of his choir boys making up the sentence:

as a useful little exercise in the five chief vowel sounds in their right order The advantage is obviously great if the children make up their own little gymnastic sentences for practice in diction.

VI. ON MUSICAL FORM

AT the time of preparing this section of *Teaching in Practice*, the writer chanced to receive from an unknown primary school teacher a short memorandum of some 1,200 words "on the teaching of melodic composition" to school children under his care. It would seem most useful to quote from this very practical document here, and as far as possible to link up thoughts on the principles underlying musical Form with the experience of a fellow-teacher in an original adventure of applying them to practical purposes in his own school (obviously unaided by any books on the subject).

The principles of musical Form concern every music lover and music teacher from the highest to the humblest Of course the man who would aspire to write a Symphony which might have served as Beethoven's Tenth or as Brahms's Fifth would have to know a million things of which no school child writing a tune need ever hear or think But both the one and the other would need to work (whether consciously or intuitively and unawares) upon the few simple and lovable principles of fine Form which alike seem to underlie great Symphonies and small tunes. Let us recall them and give them names.—the principles (1) of initiating phrases, (2) of balancing them, (3) of repeating, (4) of developing, (5) of contrasting, (6) of rounding or finishing. This handful of working principles seems, as has been said, to lie behind all the constructings, phrasings or patternings of all musical compositions of whatever magnitude, from the most complex Symphony such as Beethoven's Ninth to the shortest melody such as "Barbara Allen" —

And behind all these principles there certainly seems to lie the one exuberant, indomitable principle or fact of creative energy itself, of joy in doing things, which alone maintains and unifies either the Symphony or the tiny tune, from first to last. To quote from our schoolmaster's memorandum, he writes:—

"It should be clear that the primary aim is the development of spontaneity on the part of the children. They must be ready at all times to move off on a joyous adventure".

"I too will something make
And joy in the making"

wrote Robert Bridges long ago. This couplet sums up the tune-making impulse.

I. ON INITIATIVE OR FIRST PHRASES

It may be well to begin this section by admitting that no sooner had the writer set down the sub-title than the mind became held up, bafflingly unable to begin to discuss beginning. Yet the principle of initiative needs discussion. The power to make a start is hard to attain. The starting phrase is, of course, dependent upon enthusiasm; but enthusiasm *plus* something; enthusiasm *plus x*! for even enthusiasm has often to wait pathetically upon initiative. The simile of a simmering kettle is informing in this connection. The "first phrase" of the gentle, welcome song of a "singing" kettle at tea-time is brought about by heat (enthusiasm); but also by the containing obstacle, the kettle itself, and by its shape. Enthusiasm *plus* surrounding is perhaps one dull way of suggesting the primal factors which cause, let us say, a Bohemian to start singing a Bohemian tune, and a Britisher a British one. But it is not enough to leave it at that. We know children are full to overflowing of innate powers of enthusiasm. Bergson's *élan vital* is their heavenly birthright, and that incidentally is why song comes so naturally to them. But clearly there is something for teachers to provide for, or at least to suggest to children in the matter of this starting principle, something which they ultimately may learn to supply themselves, and then to quicken in others when their turn to do so comes.

Here is another quotation from the teacher's memorandum:

> "Children regard the writing of music as something very wonderful and quite beyond their capacity, and indeed, when it is suggested that they should write tunes, most of them experience great dismay. When, however, the initial difficulty has been overcome, scholars usually develop a keen interest and enthusiasm for this new pastime".

The unknown quantity which surmounts this "initial difficulty," this $+x$, has very various manifestations. One, curiously enough, is obstacle. Difficulty itself is an incentive. Give the children a definite problem to solve, a definite difficulty to surmount. The ocean and its invisible tides may be likened to a great enthusiasm. But the splendid showing of that power, the forms of waves, breakers and foam, with all their glorious effects of shape and colour, only *begin* when there are obstacles,—rocks and hilly shores. The obstacles provoke the glory. These obstacles are, together with the enthusiasm, the actual conspiring causes of beauty beginning. For this reason, give children words to set. Challenge them to find out where the highest note is wanted, and when the notes must lie low, where a lot of quick notes fit, and which note must be held. Give them the problem of inventing a musical rhythm that fits each line, and even that of deciding how many notes they want sung in one breath, for that will give them the length of their phrases.

But another method is of the very opposite kind. It may be called the method of *vacuum*. Draw a tune on the board *without* its first phrase, and ask the little ones to fill it. "Nature abhors a vacuum", and so does the creative imagination. To name but a slight example,

enthusiasts at a dull committee meeting may often be seen idly covering the blotting paper lying in front of them with decorative devices of all kinds, as cryptic perhaps as the early art of cave-men, but full of exuberance Spare energy finds its outlet. Or, take another kind of example. Give an enthusiast a waste bit of land He will initiate a garden there. Indeed it seems as though in these two ways we find two chief methods of starting the creative impulse in a child or a man Heaven will give it the *élan vital,* if a teacher will but give it the containing or defining factor, the obstacle or the empty space; or in some way, by some means, the empty sketch of a frame, the skeleton shape or plan that will start up the willing, devising, responsive engine. It is noteworthy that the most wonderful creative artists the world has ever seen have required something in the nature of a tag, an obstacle or a vacuum or other provocation, as nucleus to start their genius. Yet it is hardly strange when one remembers the principles of crystallisation in nature. Think of the string in the sugar candy. Who could have expected the imaginative powers of a Shakespeare or a Bach to have crystallised round nothing? Is it surprising that both used to seek systematically someone else's "bit of string," someone else's trivial story or composition to work round? And *c'est le premier pas qui coûte.* Yes, enthusiasm may be the major partner in the transaction, but men may wait a lifetime for *le premier pas,* for that first phrase in a simple tune of their own, for lack of the simple factor which will release or provoke a start in the joyous activity Our schoolmaster's threefold experience in this matter is so clearly to the point and comprehensive that it may well be quoted *in extenso* He writes

"By far the greatest difficulty is getting the children to start. Three methods of approach are useful The first consists of a rhythmic pattern which may be clothed with a suitable melody The second is the catching of a snatch of melody and then building up a complete melody upon it on the lines of an approved plan. Both these methods have their place, because the first has so much to teach about the rhythmic structure, while the second provides delightful exercises in variations of thought-structure A little adventure of five or six notes may develop into scores of different completed melodies, each bypath of melody seems to lead naturally into its own adventure-land The third method has proved in the writer's experience more successful than either the first or the second, for neither of these methods leads children to make a start quickly; and it is the start, the beginning of the adventure, that is so important.

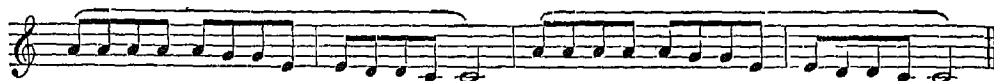
"The third method consists of leading the child spontaneously and quickly to sing the words of a well-known hymn or song *to a tune of its own.* The child must be advised that the less it thinks beforehand of the tune it will make, the better will be the tune it will sing, *for the words will send it off on a melodic adventure* the rhythmic basis of which will, in most cases, be that of the original tune Considerable success has attended this method of melody construction; so much so, that it has been found possible to call upon any child in a music class to sing a new tune, and to hear given in response tunes at times so good as to take the place of the original tunes This has occurred on several occasions in the writer's experience, and tunes so made up have become the tunes to which hymn words are sung in school."

As mere testimony to facts and recent school experience, the above words seem worth their weight in gold

2. ON BALANCING PHRASES BY REPETITION

The principles of Repetition and Balance in music are obviously by no means the same; but they are in practice so inextricably associated that it seems serviceable to consider them together, provided it can be done without confusion.

The room in which the writer is at work at this moment happens to be a hotel bedroom at Brighton, and it is absolutely crowded at every point with examples of balance by repetition,—whether free-hand or machine-made—in the window curtains, in the scrolls on the chimney-piece, in the vases on the mantelpiece, in the panels of the door and wardrobes, the pillars of the brass bedsteads, in the turned-out "toes" of the ornate chair legs, the pattern of the inkstand, and the leatherwork of the writing table, etc , etc , etc. Even barbarous melody can apparently take pleasure in repetition for its own sake without any idea of balance. A child, in like manner, having got hold of a fragment of melody or a mere rhythmic figure may, in its more childish and more barbarous stages of development, take a positively aggressive delight in repetition over and over again for its own sake. It may be assumed that the love and awareness of balance and the intuitive obedience to the great principle of balance come later, and at a slightly higher stage of development. However that may be, both are essential working principles of melody-making, as of poetry (and, one may suppose, of all art). And they run concurrently. Repetition has many melodic uses. Try repeating such a fragment as this:—

Give it to a class to sing over and over again and watch the effect It gradually rallies the weaker members of a class, it gathers momentum; it unifies the team's output, it brings all scholars to what may be called absorption point, and gradually improves the detail. But as soon as it has done these things, it begins at last to approach what may be called saturation point. Ceaseless repetition may (like a battle-cry) augment feeling, but it will inevitably at the same time dilute or dissipate thought. Before such a danger-point is reached, surely it must be turned off. As a matter of fact, the above fragment was collected and phonographed by an Australian university professor from the singing of houseless, naked aborigines in central Australia quite recently It was repeated rapidly, correctly and *ad libitum* by these natives and the one phrase constituted the whole song One may imagine that there is hardly a school in the country that would not feel ready for a new phrase (see section on Contrast below) immediately after singing it at the most four times. Let any teacher try it on any young children. It may safely be guessed that almost any tune-writing Kindergarten class would rather choose to repeat it once only, with a feeling for Balance

and that then the urge of progressive adventure would, in accordance with either the principle of *development* (of the same phrase) or complete contrast (through a new one) bring a change. Children will be found to love balance by repetition. Nor will they be wanting in the notion that repetition gives instant opportunity for improving the repeated phrase in some way or other.

Tell children that their tunes stand on two legs not on one, and the simile will convince them of the inherent need of balance by repetition One has only to show them their own two hands to make them aware that balance does not involve absolute identity. A very good example of a school-child's instinct to balance by repetition is to be found in the following, taken from the teacher's memorandum already quoted. It also shows the impulse to

develop rather than to repeat. (The "$+x$" in this case that started the engine was the little invented tag of rhymed drilling jingle):—

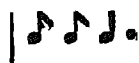
3. ON DEVELOPING PHRASES WITH BALANCE

We here move naturally to thoughts on the principle of development. It is possible to conceive a tune which shows scarcely a sign of this principle. But such a tune would be rare. Let us for a moment re-write (and incidentally spoil) "Barbara Allen" (quoted above) so that only the principles of Initiative, Repetition, Balance, Contrast and Rounding off or Completion are in evidence, care being taken to avoid all the inherent tendencies towards thematic development.

Now if we take the component phrases of the original tune apart, we shall see probably with vivid and convincing clearness the principle of development at work at every stage:

Here the subtle workings of the development principle, the signs of natural melodic evolution, are almost too numerous and delicate to trace. But the broad design illustrates

the workings of many of them. Every single phrase exemplifies a love of rise and fall. The melodious touch is so gracious and light that you could, as it were, at a breath blow each phrase out of the true. Thus the first phrase might become at a touch this.—

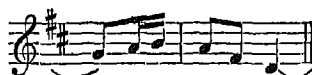
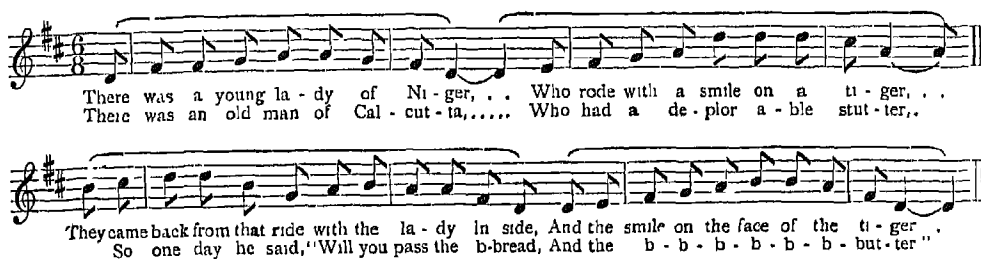
But in that case what could happen to enhance the last line? So delicate is the poise and so apparently unfailing the development principle that not a note can be altered. Every first half of every one of the four phrases falls into this metre.

Yet none are the same:—

Again, every final *lean* of every phrase "features" a drooping third, yet not one is a repetition of the other —

But perhaps most noteworthy of all is the way in which the initial rise and fall in the first line is developed in the second and fourth:—

And nowhere perhaps has the principle of development a more beautiful hold upon this tune than in the contrasted third phrase. Here the droop is the new feature. It is as different from the original phrase as it can well be in a tune of consistent rise and fall, and

it is cast in a rhythmic mould that does not vary. Yet the tune manages to make the second half of this new phrase a balanced development of the first half this—

is answered by this—

It is worth noting that the tune as a whole fulfils all the requirements of the popular and convincing A A B A form referred to below, and yet no phrase is a mere repetition of another, nor is the contrasting B phrase so different as to break the spell of gentle melodic evolution. In the sphere of poetry the best Limericks do the same They are cast in a similar mould and combine in the same masterly way obedience to the principles of initial adventure, balance, and repetition So true is this that there is scarcely a good Limerick that could not be effectively sung to a variant of "Barbara Allen".—

The consistent correspondence of repetition and development as between the design of words and the design of melody are here reminiscent of Morley's fine matching of Shakespeare's

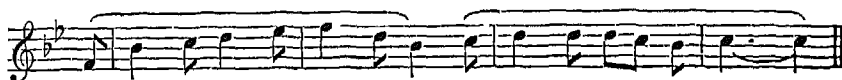
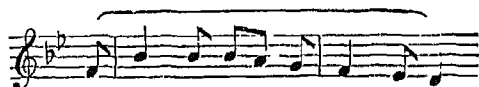
> "In spring-time, in spring-time,
> The only pretty ring-time."

It will be remembered that the melody is so made that "spring-time" and "ring-time' always melodically rhyme.

There are obviously numberless ways of obeying the twofold intuitions for balance and advance by development simultaneously. Indeed, it will be seen that in a true tune, in any spontaneous melodising by children, the budding composers as surely balance while advancing (or rather balance *by* advancing) as do birds or bicyclists or tight-rope-walkers! Balance in tune-writing quickly pervades all effort and becomes second nature Indeed,

melodising should at last become so easy that the phrases balance themselves *ambulando.* To stop the tune to think of balance brings as sure a tumble to the inspired melodist as stopping a bicycle to ponder over the next effort would bring to the bicyclist.

4. ON CONTRAST AND BALANCE BY CONTRAST

The principle of contrast in musical form is perhaps better to be seen in works of greater magnitude than in a child's tune. The contrast between the first and second subjects of such a Symphony as Beethoven's C minor is as marked and as inevitable as the contrast between any normal hero and heroine in an epic. None the less, this principle is as pervasive and important in the little tune as in the Symphony A very good example is to be found in the second phrase of "The Lincolnshire Poacher," which runs.—

Remembering the fall of the initial phrase:

it is easy to see how the tune gains by the immediate jaunty contrast of the rising phrase where a repeated droop was to be expected. The poacher was a jaunty, resourceful fellow so the unexpected phrase is wholly fitting.

Contrast does not involve break in continuity or in consistence of style. It uproots nothing in a tune. It more often adds something that was missing and needed saying. If a tune has been very busy and adventurous, as, for example, in the "Rising of the Lark":—

the contrasted phrase may, as it were, rest on the wing with advantage:—

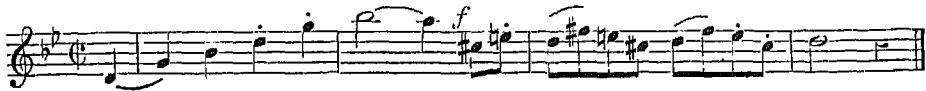
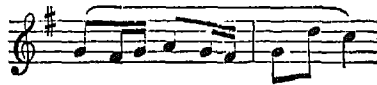
This is a particularly striking instance of the working principle of contrast in a folk tune; for, even while the contrasted phrase is being dwelt upon, the tune soars suddenly back into its first mood and completes the transaction in a peculiarly satisfying way:

[(B) passing imperceptibly into (A)]

If the three fragments quoted above be played in succession as they stand, the reader will experience on a very small scale the satisfaction of all the principles so far discussed,—initiative, balance, repetition, development and contrast.

It is obvious that all melodic manners contrast with their opposites —upward phrases contrast with downward; repeated notes with moving rises and falls; scale phrases with chord phrases; passages in rapid notes with those in stolid, slow notes, steep passages with those which pirouette lightly round a centre. These contrasts are often to be found within one and the same phrase. The effectiveness of the first arm of the tune just quoted, for example, is doubtless increased by the fact that its chordal curves:

are fulfilled by a sudden scale-rise.

to be followed by another curve in the key chord. A striking example of this kind of thing is to be found in Mozart's G minor Symphony (Finale) which begins:

How exhilarating is the contrast within itself of the brave, sweeping arpeggio and the fussy circling in chattering quavers round its dominant! Again Beethoven's instant, playful and masterly answer to

in the G major Piano Concerto is surely unforgettable when once heard:

Beethoven himself seems to have enjoyed it greatly, for every time it recurs, his repeated comment is:

Composers by no means only use contrast for giving us a new thought, in a new mood, or in order to rest and refresh us after a more or less completed set of thoughts of another

kind. They also may be found using it for fulfilling one thought by a contrasted one. This may be called balance by contrast, and children are extraordinarily quick to treat it as a good game. Propose such a phrase as this to any dozen children:

and it is probable that a great variety of balancing contrasts or completing phrases of the same length as the original will be invented by the children, one after another, if given slight encouragement It is well not to give them too long to think. The game of child's repartee should always be swift, in order at all costs to maintain the freshness of a joyous and quite unpremeditated melodic reaction to any simple fragment set going in their minds. This kind of balance by contrast in melody is exactly of the nature of repartee in conversation. Indeed, it may well be called "balance by repartee," and the art of it should be systematically and emulatively practised in class from very early ages. The impulse to give contrasted replies seems to lay hold of some feature in the first statement and give it a new and an opposite turn. It is like giving the "other side of the question"

The cross-eyed grumpy man, who, bumping against another man in the street, growled: "Why don't you look where you're going?" had his good answer in a kind of melodic repartee when the other replied. "Why don't you *go* where you're *looking*?" It is easy to devise an exact musical parallel for this, e.g.,

where the phrase remains virtually itself except that change places with

5. ON LAST PHRASES AND ON KEY AND CADENCE

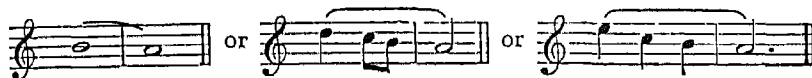
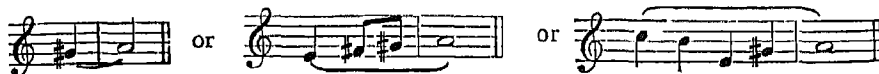
The principle of *Rounding* or Completing needs careful noting here A basic principle of a child-made melody, as of any other, is that it comes to rest with the attainment of some sort of wholeness or completion

Recurrence of a phrase and return to a point seem to be two perpetual symptoms of good, conclusive tunes It may be mere return to a starting or principal note, called in old days the *final* and in our day the *keynote*, that brings our tune to an end, as e g .

Or it may be recurrence of a whole phrase, often called a refrain; or indeed it may be the return of a whole section, in which case the tune takes on the nature of a *rondo*, and becomes what is called a ternary tune. (See last part of this section.)

Just as the joy of adventure naturally leads the mind to seek variety away from its starting point, so, sooner or later, variety itself seems to lead us back to a longing for our starting point The return to a first idea seems intuitive and unfailing. This intuition for return gives us ternary form.

Now the essence of rounding or completing in melody is to be found in the things called *keynote* and *cadence*. At this point therefore, and before going on to consider complete tune-patterns, it will be necessary to give close attention to those two; and they involve us in a few elementary harmonic matters which are not strictly part of melody but yet bear vitally upon it.

The primary essentials of melodic form seem to be a central tone or note, with a system (however unpremeditated) of beautifully and intelligently related tones about the centre. With these two essentials it is possible to design a tune; without them it is not possible. And the primary essentials of harmonic form are in like manner a central chord (or group of related tones) with a system (however simple and unpremeditated) of beautifully and intelligently related chords. Now the obvious way to round off and complete a melodic form is to move homewards to the final or keynote from above or below it. Imagine a melody with A as its final. The obvious elements of Cadence are a move to that note from above it:

etc., etc., or from below it:

etc., etc.

When two or more singers are singing different parts, harmonic intervals and chords begin to arise. It is not surprising that the last journey home begins to sound doubly satisfying when one part approaches the final from below, while another does so from above:

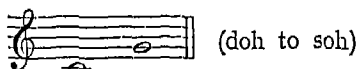
And after this kind of solid musical satisfaction has once been experienced, it is natural that melody itself should be enriched. Imagine a lonely melodist, who had once sung

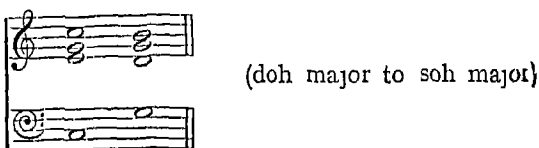
canzonets in duet with a friend, being cast on a desert island and ending an evening song alone, with tender recollections of the joys of:

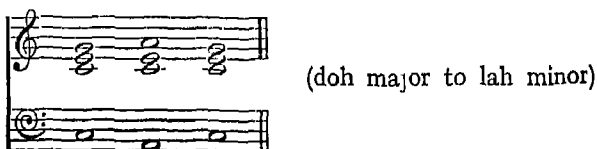
It would be likely that his final melodic line would close in some such way as this —

As has already been mentioned in Chapter IV, the primal motives of making melody and harmony, of hearing notes in delightful *succession* and *combination* respectively, act and react from the first and continuously upon one another. For that reason no thoughts upon final phrases and cadence in melody (even for the simplest educational purposes) could in any way be considered complete that did not take careful note of the harmonic elements of what is called Key, or sometimes Tonality

Key and Harmonic Cadence.—Key is the specific name given to the little "solar system" of related notes and chords which in the course of the last few centuries of western music-making have naturally evolved and grouped themselves round any given tone or keynote. The process by which key has come about must surely be one of the most fascinating in music, or indeed in the history of any art. It has been unforced, very gradual and very sure in its steps. It has remained very constant. The whole thing has evolved by a sort of tacit agreement from generation to generation And its chief features, such as relation of keynote to fifth:

(doh to soh)

and of key-chord (or tonic) to dominant chord:

(doh major to soh major)

or of so-called tonic major to relative minor:

(doh major to lah minor)

are as familiar to the ears that scan the musical horizon to-day as are the Great Bear or the Pleiades to the eye that scans the heavens on a clear night And just as certain familiar constellations (to eyes on this particular planet and in this particular hemisphere) are seen to move round one star in the heavens called the Pole-star, so in the musical heaven of men's creative imagination (to ears of this particular generation and more particularly in Western Europe and America) certain recognisably familiar, acceptable, generally enjoyable groups of tones called chords are heard mentally to centre and move in fixed relation to a given tone called the keynote.

When a child is thinking melodically, the keynote is its centre. When thinking harmonically (and children to-day are brought up harmonically whether we will or no, for they hear the same few harmonic remarks, made interminably,—alike in the music of the street, the church, the drawing-room, the theatre, the restaurant) the *key-chord* is the centre And the so-called true Cadence on to that chord is a harmonic fixative, especially when it gives a prominent place to the leading note and the falling seventh marked *:—

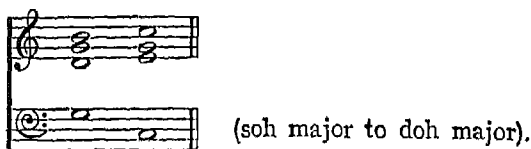
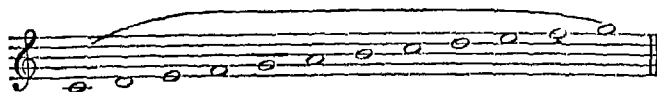
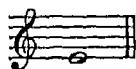
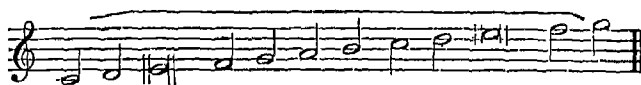
perhaps even sounding these notes alone, relying on them and leaving the rest merely implied:

If the reader will play this last example softly many times over to himself he will realise that this particular progression enables him to get his aural and mental key-centre in as familiar and sure a way as the two stars called the pointers in the Great Bear enable him at all times to set his eye and mind upon the Pole-star. The analogy, indeed, seems a particularly safe one just now, when the musical heavens are embarrassingly crowded with dimly seen new constellations as well as the old.

There seems need from the first to familiarise the smallest child with its natural friend the major triad:

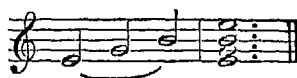
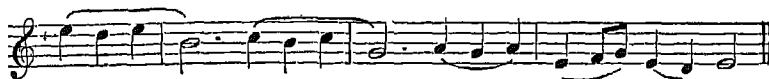
This need in no way prevent its progress in melodic thinking. With the natural scale as its very friendly *tonal alphabet*, and that natural scale not confined to any one octave, it can think its musical thoughts first round any keynote, but almost at once round the key-chord (major and very soon minor also) The writer suggests that the use of any other chord than the key-chord for each melody should be long delayed, leaving the melodic and rhythmic impulse as free as possible But when the child is ready for a second chord to enter the mental horizon, it should surely be a chord which links up familiarly with the key-chord,

and precedence will possibly be given by most teachers to the chord which, together with the key-chord, makes a perfect Cadence:

(soh major to doh major).

The whole matter may perhaps here be put in a slightly different way. A child wakes up in this world to find a ready-made tonal alphabet called the natural scale (see Chapter IV) and in a particular section of this scale its own voice is interested and concerned:—

though to sing above or below that compass is not too difficult. Every child has the power or faculty to listen hard to any one note, and in so doing to make that its chief or home or keynote. If it has a wandering ear or mind, that is drawn off one note to any other without security or the sense to relate the new note to the old, its music will not flourish. But if, on the other hand, the mind develops the faculty to hold on with memory to one note and *relate* and even to *group* notes round that given note, melodic ingenuity and delight will together quickly flourish. Suppose the given note were E.

The two Es within the child's ken and power become at once paramount.

So of course does the next perfect relation, the fifth (see Chapter IV) and the melodising instinct has at once got secure double anchorage, round which—within the ready-made tonal alphabet—it can securely melodise. Given E as the home-note and the natural scale as field, the melodist would most easily and naturally sing immediately round his principal notes:

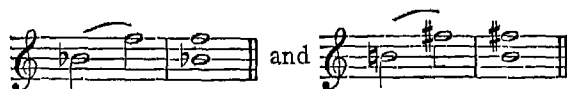
But it would manifestly be a gain to his whole outlook to resort early to his key-chord:

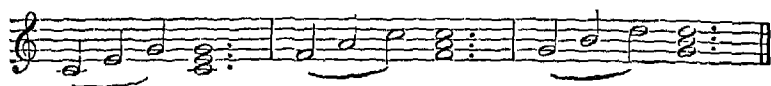
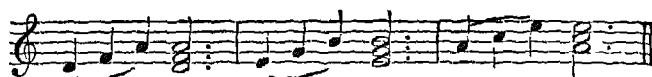
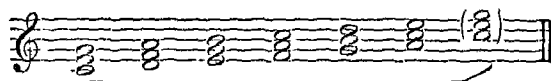
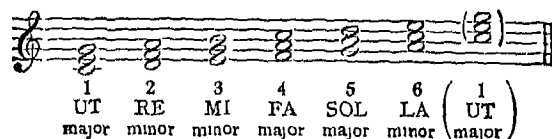
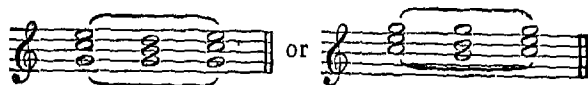
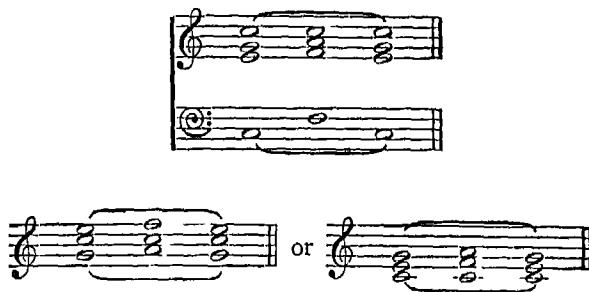
Now the whole gamut is easily covered;

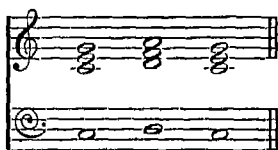
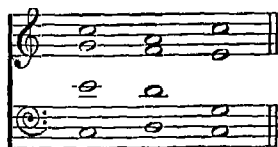
the slight leaven of harmonic thought:

has made a vast difference, and such melody as this, e g.:—

is made gracefully easy (It seems a pity that the Phrygian manner of melody which would naturally end a tune with the beautiful Phrygian cadence

is temporarily out of fashion and unknown)

If the teacher of elementary melody-making, haunted with the customary harmonic jargon of to-day's hack music, desires to reach his own harmonic conclusions,—not from popular hymn tunes on the one hand, nor from dance or restaurant music on the other, nor even from the harmonic directions given in books on Harmony which are purposely based on common usage, he will probably do well to discover all the common chords he can for himself, within the natural scale on the keyboard He will soon find that to chance to hit upon B for his home-note is to be faced with what was called a false fifth.

landing him in the Locrian Mode of old—the *Modus falsus.* He will also incidentally realise the great uses of the first accidentals, B♭ and F♯:

which came to the rescue to dispel the "false relation" between F and B which (in its most strident forms) was nicknamed *diabolus in musica* But as he proceeds, apart from the

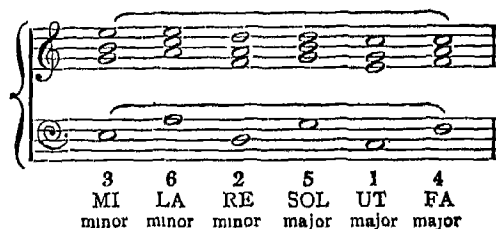
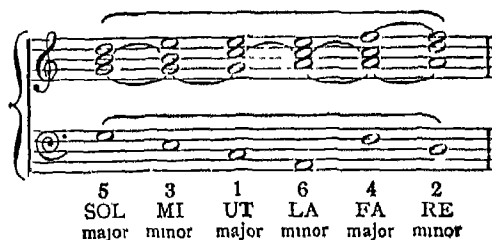
unfortunate B, he will soon discover that there are six common chords or triads possible to him in the natural scale, three of them major

and three minor:

There are no more and no less If, omitting the false fifth, he now sets all these possible chords in line, scale-wise, or as it were on parade for inspection:

he will be able to review the natural harmonic material and relate the resultant common chords to each other. But first let us give them each a name and a number, choosing for the moment the age-old fixed names given a thousand years ago in the *gamut* and retained to this day as fixed key-names in France:—

Here then are all the possible chords in the natural scale, which for natural reasons has become so basic a group *of related tones* In other words here are six common chords inwardly and permanently related with one another *for euphonious reasons.* We may make up melodies in any of the modes, from the delicate Phrygian and Lydian of old to the overmastering Ionian, and these chords will still remain our harmonic stock-in-trade. These six are the supporters of all the modes alike, and in modal harmonies it is by their cadences we can know them. Gazing, so to speak, with our ears (eyes also may be a help) at these six chords, we shall readily perceive how many are the effective relations or progressions between them and why SOL and UT become so powerfully allied. Play them in succession, obeying the melodist's natural law of moving from the component notes of one chord to the notes lying nearest them in the next chord, as for example:—

and it is apparent that such progressions have a unique combination of strength and peace (or smoothness) in effect. The above chords have *one* note in common, and both are major. These characteristics are only fully shared by the companion progression between UT and FA:

The three similar progressions—between RE and SOL, between RE and LA, and between MI and LA—have like strength and usefulness These five progressions, taken together, are, as it were, the staple fare of the harmonist.

But it is possible to relate chord to chord in two other tellingly different manners. You can have a progression from one of our six chords to another either having *no* note in common between them or with *two* notes out of three in common. As may be imagined, the mental effect of the former is abrupt. Indeed, if taken in similar motion it is so abrupt.

as to be avoided by every harmonist; and it was strenuously forbidden by an old by-law. Contrary motion and careful management of parts can, it is true, turn abruptness into rugged strength:—

but, even so, grace seems excluded.

On the other hand the mental effect of moving from chord to chord holding two notes in common, while it lacks strength is preeminent in grace and smoothness.—

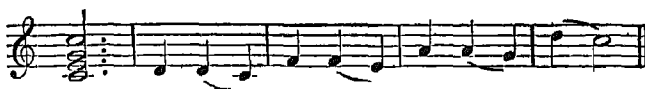
It is useful to note that there are no other kinds of progressions between any two chords within the natural scale than the three given above; and they may conveniently be catalogued in three concise series as follows:

SIX NATURAL CHORDS

(1) Related with one note in common:—

(2) Related with two notes in common:—

(3) Related with no notes in common.

These three should be very carefully committed to memory by any teacher. They are of the very essence of tonality and key. They have each marked characteristics of their own of far-reaching use. For smoothness—as for example in the harmonisation of a lullaby—progression (2) cannot be surpassed. For harmonic strength (3) is preeminent; while for what may be called normal harmonic diet (1) is manifestly desirable. Yet all three should be familiar to every mind and ear and at a touch available. Their ever-varying blends in all sorts of beautiful compositions, simple or complex, can give endless delight.

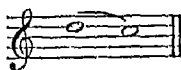
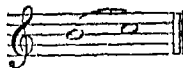
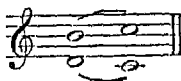
The teacher will naturally wonder how much of this will concern the child who is learning the meaning of melody? At the very least the children will want to know about and begin with the key-chord. It is a strong tower to the baby melodist, as to us all. By passing notes from note to note of the chord:

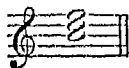
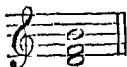
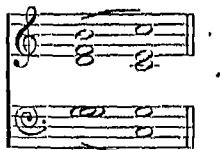
by grace notes upon it:

by inflections turning themselves round it:

as well as by the more obvious arpeggio and broken-chord melodies:

and by numberless delicate combinations of these, it will be found that a single chord can be endlessly useful for melodising. Melodic devices and delights group themselves upon it as creepers upon a wall. The moment any child is ready to do the simplest harmonic thinking, it is suggested that in the first advance from the one chord position, the child be helped to fix one of these three in an UT major group:

After this the idea of the Perfect Cadence, the *clausula vera* of the sixteenth century, which seems still the securest and most natural link between melodic and harmonic thinking, could

well be introduced The melodic essence of a cadence seems to be found in moving to your Final or Keynote by step from above:

or from below:

or from both:

In doing this, it cannot fail that the harmonically inclined mind will delight in adding the third and at last the fifth:

This gives the cadence in its old form And incidentally it brings us to an extra chord which is very common nowadays. For though the interval of the false fifth ruled out the natural triad on B:

yet the three notes which constitute that triad are well-sounding enough when arranged thus.

So, strangely enough, this ancient cadence so much used by Handel has perhaps greater use to the melodist, when first feeling after harmony, than its more robust and complex successor, known so much better to-day:

But *both* should be given the children at latest in their fourth year; and they should be allowed to hear the perfect cadence (in these two forms) many, many times before they are able to write or use them for themselves, if for no other reason than to enable them the better

to grasp the Symphonies of Haydn, Mozart and Beethoven when they hear them on the wireless or otherwise.

To conclude our harmonic considerations, here is a complete list of the two kinds of Perfect Cadence:—

In melody, even a child will often alight at the end of a B section of its tune upon a degree of the scale other than the keynote, as a bird will rest upon another bough than that on which its nest is built This does not need any harmonic support But as the mind begins to work harmonically, it will not only flit from bough to bough, but from cadence to cadence. In one of his simplest Sonatas, it will be remembered, Beethoven seems to carry an unwieldy harmonic paraphernalia of cadence on his back in a simple final line of a C major tune, thus:—

6. ON TUNE PATTERNS

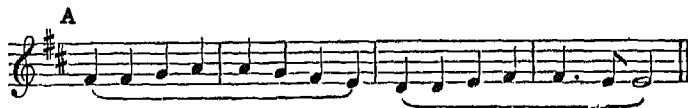
Binary, Ternary and "Four-square."

It will now be convenient to sum up the above discussions of the vast question of musical form in its simpler aspects.

Two very distinguished historians of our own day once had a friendly but large-scale dispute as to whether the accepted Sonata and Symphony (first movement) form was really *binary* or *ternary*. Sonata form came direct from the typical *Suite-movement* form, said one,

which was binary to the bone In the *Aria* form, said the other, which is ternary in essence, lay the obvious origin of our present first-movement form. The present writer heard one of them exclaim, "If A—— has his way, it will put history back fifty years!"

To both it was a matter of principle; and so neither could yield. To the onlooking admirer, however, it seemed very clear that both were right in saying *yes*, to binary and ternary respectively; and both were wrong in saying *no* to either "So like his father," said one, looking at the promising heir. "The *image* of his mother," retorted the other. And both were right! The binary or twofold principle is surely none other than our ubiquitous old friend, the immutable law of Balance, applied *in extenso* to a complete musical form A balances A; and B balances B But A can also be made to balance B by contrast, therefore AA can balance BB; and better still, the scheme ‖ AB ‖ AB ‖ can give a good binary scheme of balance. Correspondingly the ternary principle is surely none other than a product of our two basic principles of *contrast* and *return*. A when balanced in itself, or even A as a *group* of balanced interests is duly and of necessity followed by contrast-section B, naturally also balanced within itself; then the principle of return will bring us naturally back to A. The convenient formula to express this at a glance is A B A, or alternatively $\underset{aa}{\overset{A}{\frown}}\ \underset{bb}{\overset{B}{\frown}}\ \underset{aa}{\overset{A}{\frown}}$ (showing the factor of inner balance of parts), or indeed AA BB AA which is a manifestly ternary form, with the binary principle insinuating itself by nature into each balanced section. Here a few fascinating questions arise: can the delights of adventure, balance, development, contrast and return combine? Can they mingle in one form, or are any of them in any way exclusive of each other? In other words, are the binary and ternary impulses compatible or not? Is there an unyielding voice within each or either of them insisting "I am twofold," or on the other hand, "I am threefold"? The answer lies in the fact that there are numberless tunes that by some satisfying device are made to "stand four-square to all the winds that blow" and yet certainly seem triumphantly to reconcile binary and ternary joys, and successfully satisfy in one and the same adventure the constituent demands of balance, advance, contrast and return. And whereas the sixfold A A B B A A would often if not always pall upon us, by great good fortune we can get all we want by striking out two of the six phrases or sections, either one of the As and one of the Bs, or two of the four As. The essence of Binary is balance of A with B or B with A. The essence of Ternary is contrast and return, contrast which B brings after A and return which A brings after B. Hence either A A B A or A B B A satisfy our full demands.

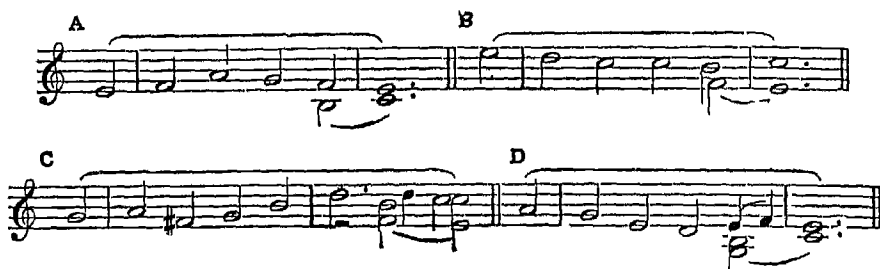
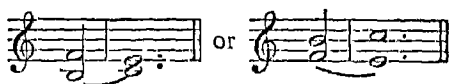
Let us take one wonderful and famous tune (from Beethoven's Ninth) as an example of this *fouring* of tunes. Here is the first or A phrase:

Here is its second or B phrase:

If the reader will spend a little time playing (or humming) and studying these two parts of a famous tune separately, he will soon realise that neither any attempt to set them out convincingly in a form of three sentences (A B A) nor in a form of six (AA BB AA) could satisfy him, even though he allowed Beethoven to alter them in detail at any point, in order to dovetail one phrase into the other in every practical and beautiful way that could ensure continuity. The time spent in leisurely reflection and surmise of this kind will not be wasted if it serves (as it probably will to every reader) to bring conviction of and admiration for the rightness of the seeming compromise which triumphantly meets both binary and ternary demands in the popular and satisfying four-square form known as AABA. Beethoven's turns of thought at bars 7, 8 and 12 should specially be noted With the least possible alteration they seem to secure comprehensiveness, variety and continuity at crucial moments in a way as obvious as it is masterly:—

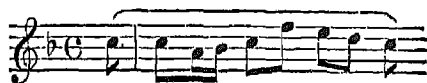
It should be observed that many another AABA tune might more easily bear repetition in the more literally bina-ternary combination (AABBAA) than this tune does. Furthermore, Beethoven repeats his last 8 bars in such a way as to present the tune after all in a sixfold way AA BA BA. But this repetition of the last half is not a necessity but an exuberance. There is obviously exhilaration behind it, rather than design. It reminds one of the effect of the Welsh *hwyl*, which, when it drives a massed choir into an ecstasy of song, frequently drives them to find outlet for that ecstasy in repeating (sometimes 3 or 4 or more times) the *final half* of a four-square tune (AABABABA . . .). The gathering momentum of such an act and its buoyant spontaneity must be memorable to those who have ever heard it.

From the above considerations, it may be fairly easy for readers now to trace for themselves the many variant tune-patterns that are possible within the four-square scheme if we do not insist upon their being either binary or ternary, but just balanced and rounded. Thus if A balances A and A also can be balanced by contrast B, then it follows that a further contrast C could be used to balance either A or B, and still further (if we really forgo any desire to return to our first thought in the final phrase and determine to journey on), we can actually undertake A B C D as our most diffusely adventurous effort. Even this will be allowable, by reason of the fact that A can be made to balance B, C can balance D, and A B can balance C D. Provided the four phrases maintain some feature in common, this can easily be satisfying in its own way. The craving or indeed the deep-seated need for return to our first thought can find an effective deputy if only some slender but perceptible common element is present in all four phrases, binding them in one. Here is one such extreme example

of a tune that deliberately ignores ternary needs altogether and plumps for balanced variety in four-squareness.—

Innumerable are the hymn tunes and double chants (forming, alas, too monotonously our staple fare in churches), which may be described as A B C D tunes. They are not only the natural companions of hymns that dispense with refrains, and whose stanzas and lines are a series of meditations or reflective aspirations on one subject; they are also a notable result of the power exercised by tonality and by the device called *cadence* or *close*, already described. They form, indeed, a group of tunes which happen to be so securely unified harmonically that melodically they may be varied profusely. Take the charming short metre hymn-tune called St. George:

Here is an A B C D tune with no effort even to return to the first phrase A or even to carry the mind home to the keynote.! Yet it is unified completely by having an implied perfect cadence

at the end of each of the four phrases

To conclude, it may be well to revert for a moment to the previous A B C D melody above and try the effect of lessening its deliberate diffuseness without sacrificing variety. The deepest drawback of an A B C D tune is not that it is different in every phrase, but rather that it seems to neglect or set little store upon its own features, perhaps most upon its own rise and fall. Phrase A is charming·

why are we to hear no more of it? We shall hear more of it in the next verse, you reply? And as indicated above, that is a good answer for a lover of hymn tunes. Yet when Bach in "My heart ever faithful" breaks out thus:—

is it not of the essence of the contract that he never fails thereafter to repeat it? A, it is true *need* not repeat itself; yet its beauty can so seize the mind as perforce to re-echo within it somewhere. The four phrases A B C D in the above, for example, need not start four different trains of melodic thought With higher values for rise and fall in mind, let us try our hand at a more unified tune still based on the same material:

Interdependence of lines within the simplest tune seems always to be based upon and exemplify the unfailing workings of the mind given to adventuring, balancing, contrasting, developing, repeating and returning

It must now suffice to set down typical practical variants of the four-square tune, leaving readers to work out for themselves, if so disposed, an exhaustive table of all possibilities:—

(1) embodying only balancing and contrasting

A A B B   A B A C   A B B C
A B A B   A B C C   A B C D

(2) embodying both binary and ternary requirements (i.e. balancing, contrasting and returning):—

A A B A
A B B A

Of all these the last two are melodically most complete. Of course there are infinitely diverse ways in which each phrase may enhance, develop, decorate its predecessor, fulfilling, as the melody proceeds, all the delights of an adventure that balances, develops, contrasts and completes the journey with convincing and unhindered delight.

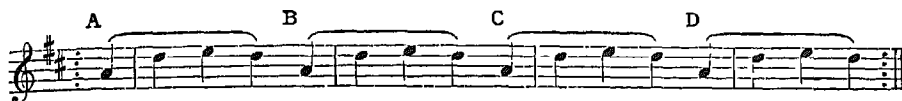
VII. GENERAL HINTS ON CLASS TEACHING

PRACTICE-hints to teachers in day schools are here offered with much diffidence, because the writer's experience has been limited to work with choir boys; and though these have included every sort of dull or bright boy of every class or kind, yet choir boys are usually chosen for aptitude for their particular work, so that in the mass they would present less difficulty than an average school class. But effort has been made to imagine and meet the village schoolteacher's conditions, difficulties and needs with ordinary scholars, including those to whom rhythm is paramount and tuning difficult

(*a*) **Numbers in Class.**—Though but two or three scholars and a teacher are not too few to form a team or class for musical purposes, yet it would be extremely hard with less than six or eight to generate enough of the team-spirit for every child to venture and come "full-out" and be able to forget themselves. On the other hand thirty-two are perhaps not too many for one class. Yet it would tax the resourcefulness and watchfulness of the most gifted class teacher to see that all were fully mobilised and as fully happy as possible. About sixteen seems, from experience, an ideal number.

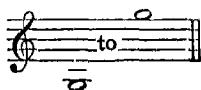
(*b*) **Sub-division and Sub-command.**—Where the class is necessarily large, it is suggested that, even with the youngest children, a system of "non-commissioned officers and men" is wise; and "platoons," say of eight, under junior commands, would work They should be called by letters: Team A under Commander A, Team B under Commander B, and so on. These teams could be turned on to sing in competition with each other with real benefit, line by line repeated, or line answering line. In this case the teacher, if careful to imbue the right spirit of friendly contest, team pacing team on the road to perfection, will find a most powerful engine for good at easy command. For example, take any small exercise:

If this be sung by a whole class of sixteen, it forms, perhaps, the most perfectly serviceable exercise that could possibly be chosen to produce strong, good tone throughout the team. But even with sixteen, the result might be attained more speedily and surely if the teacher used the platoon or group method (eight plus eight) and set the exercise going as follows:

With large numbers, the same proves efficacious, and indeed subdivision becomes well-nigh indispensable:—

At all cost, at all times, in all exercises, keep the rhythm going unbroken, while team answers teacher, or team answers team

(*c*) **Arrangement of Class and Classroom.**—The children should face the same way, all sitting at desks at a minimum radius from the teacher, who (with whatever musical apparatus is available) should be so placed as to be seen by all The teacher should also be able to see all scholars. If a picture or two be hung in front of the class, bearing upon music itself, or presenting the ideas of sky, sea, hill, or of trees that wave, birds that sing, waters that flow,—beauty of any kind that brings contented thoughts,—these can all be of great advantage. Since beauty in any form is naturally akin to music as well as natively lovable to the child-mind, and since one of music's great aims is to release and make memorable for life the child's enjoyment of it in melody, beauty seen and beauty heard reinforce each other's appeal quite astonishingly. And if the teacher has the power to vary the visual impression from time to time, and make the picture fit the song, the advantage is manifest. Drawings on the blackboard, as in the case of the poetry lessons (see Vol. II. p. 261), may also be a delightful help and stimulus.

(*d*) **Musical Apparatus.**—For these lessons the following paraphernalia are suggested as desirable, though not all indispensable aids:—

1. *A piano, or other keyed instrument,** capable of sounding simple common chords. Minimum compass suggested:

2 *A blackboard* with at least one boldly drawn music stave upon it.
3. *A modulator* for pointing purposes
4. *A gramophone* for illustrative purposes.
5 *A wireless set* for illustrative purposes.

It would seem that many schools may before long find all five of the above available adjuncts possible and helpful if used in moderation with great care Two must perhaps be considered indispensable:—(1) Some form of keyboard instrument capable of making unobjectionable sounds within the vocal compass suggested above, though it can be imagined that, with a highly gifted teacher, the mere dumb diagram of the keyboard would not prove a useless substitute; and (2) Some form of blackboard with chalk (or a sheet of white paper with charcoal) large enough and so placed, near the teacher, as to be seen by all the class. If need be, the modulator can be homemade, drawn upon one of these, and kept before the

*A Dulcitone is cheaper and less subject to deterioration than a piano

class for reference. In any case, little extemporised modulators will always be needed, in addition to a full regulation modulator. With regard to the gramophone, selected records are now so good (and instruments so much cheaper) that, where schools have no instrumentalists in their midst, and even where they have, the finest violin playing, string quartets, piano playing and orchestral works can be turned on and explained with great benefit, familiarising the children with the finest phrasing, and the finest music But it should be added that the plentifulness of records of really dreadful, vapid and complacent music makes it necessary to exercise a sternly loving censorship of the records available. The same is, in the writer's belief, true with regard to wireless. Indiscriminate listening to dance music is bad. The B.B.C., assisted by the Central Council for School Broadcasting, is most watchfully and helpfully trying to give to schools music at times and in forms suited to their needs. The stimulus of fine melody finely rendered is therefore available for school purposes as it never has been before. The gramophone and wireless apparatus seem destined to become as valuable to the music teacher as the best diagrams are to the teachers of mechanics or needlework, or illustrations to the teacher of drawing, or for that matter to the teachers of history or geography (as is borne out in the pages of these books)

(*e*) **Establishing the Attitude and Habit of Rhythmic Listening.**—This seems an all-important matter for the teacher to-day. No mere "Hint" is adequate.

When class, teacher and available apparatus are all assembled in as pleasant, airy and convenient a room as possible (by the way, let the door into the room be, if possible, *behind* the class, not in their line of vision) the supreme consideration for the teacher is to get the children really and truly into the world of sound. If "eyes and no eyes" is true, so also is "ears and no ears." The simplest first step seems to be that of setting going a *rhythmic momentum* of some simple kind in the room, as one sets a clock going, and not relinquishing it or changing it till every child has moved into response; remembering the crucial fact that the world of sound is not like the world of sight, which is preeminently a *space-world* at which you gaze with *eyes at rest*; but it is, on the contrary, preeminently a *time-world* which you behold with ears that must be alert, busy, moment by moment, since the ear mustn't miss a single note or chord, and the notes and chords are only heard one at a time. Therefore *rhythmic* coherence becomes an all-important condition. You, with the children, have to link the moments, sound by sound, into sense. If the child's response is not rhythmic, the sounds as they succeed each other are being duly handed in (as it were) at the aural receptacle, but how can they make connected sense? This main difference between aural and visual reception, between listening and looking, is not apparent to the child. The exhortation, "Look, my dear, at that lovely thing," or "Listen to that lovely thing" does not make a child consciously still to look into space, or consciously alert to listen *into* time. But that is the permanent need; and the habit of expectant listening, if only it can be formed, is the greatest asset to the class and to the class teacher of real, alive melody. It should be team-acquired. It needs not only to be made habitual but it must come to be the acknowledged "thing to be done" by everyone. Till all are *in* the rhythm, the team is no more mobilised than an army would be on the move when half of them have not struck camp!

(*f*) **Repetition.**—Following upon hint (*e*) above, and arising out of it, there comes the question of the uses of repetition, whether of exercise-phrases or tune-phrases, or of refrains or whole melodies. Here it is necessary to distinguish carefully between at least four uses of repetition in music: (1) for integral purposes of symmetry in design, (2) for getting up a rhythmic momentum; (3) for helping scholars to memorise; (4) for improving style, i.e. for practice—whether in singing, playing, reading, or writing a phrase. To take these in order:

It is well from the first deliberately to use repetition to accustom the child's mind to the enjoyable habit of balancing a phrase or rhythm by repeating it and of thinking in twos The whole plan of the lessons sketched here is dependent, to a peculiar extent, upon the scholar's grip of the joys of balancing phrase with phrase; and balance *by repetition* pervades the four years' work. This is not a thing which is merely of temporary service, but will permanently add to the power of the mind both to enjoy and make music. Secondly concerning repetition for purposes of *momentum*. It is of great importance to watch a class while such a rhythmic phrase as the following is used over and over again for *momentum* purposes:

The class visibly becomes (as it were) galvanised by the timely repetition, till all are happily in it and it is a full team-utterance. The golden moment is reached when all have been caught by it, and none wearied of it But let it be carried on, say, a quarter of a minute too long and the class will either lose interest or even become rough and out of hand. Repetition beyond absorption point is highly dangerous. It will at one and the same moment dilute thought and augment sensation, it will bore the mind and excite the body. It is astonishing how quickly it produces good results and then how quickly it disintegrates these results if carried a moment too far. This latter fact does not in the least detract from its usefulness In the writer's experience, no lesson can be complete unless the scholars have enjoyed team-momentum Repetition is only bad when interest has ceased. And this brings us to the third point. Repetition deliberately used for impressing the memory is surely common to all school subjects. "How often have I told you that!" exclaims any kind of mentor sadly. Repetition, merely to impress, is perhaps not quite so inevitable in music-teaching as elsewhere; for while repetition goes on for the higher uses of delight in design and securing team-unity it bores no one, whereas repetition merely for the sake of quickening or obliging a dull memory, while all the live memories are held up, is likely to bore most scholars. And after all, in music the interesting repetitions *are* helping the memory all the time Lastly, repetition should be used perpetually for purposes of practice with one proviso: let it always be with the acknowledged and concentrated object of polishing and perfecting some one detail. You may safely repeat and repeat a phrase till the vowel colours are perfectly natural and beautiful, or till the consonants are absolutely unanimous and strong, or till the top note has been shaded, or till the semiquavers have been made perfectly crisp, or fast, or clear, etc. etc etc. In a word, teach children to link up the idea of repetition with the ideas of enjoyment and efficiency. Use it to quickening point, if possible to perfecting point, but *never* to saturation point.

Note on Repetition. In order to realise the wonderful and pervasive use of repetition in musical design, it may possibly be helpful to liken its effect upon the ear to the effect of repeated lines upon the eye in scenery. Just as a single tree trunk has not the claim upon the eye that a whole avenue of trees can have, nor a single pillar or arch in a cathedral the claim of an aisle of pillars and arches, so exactly a repeated figure in music will dominate the ear and bring it to a listening point of an intensity which no single note or chord could possibly do. An analogy may here be suggested. Suppose, on the one hand, an artist desires to convey a vision of a distant hill and a distant sea line, with possibly the added faint human interest of a far-away ship upon it. Such a sight has entranced him and he wants to depict it

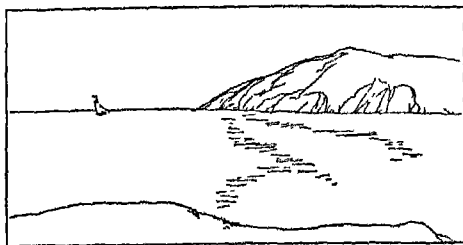
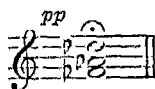



ILLUSTRATION 1

graphically for our entrancement. (Illust. 1). Suppose, on the other hand, a composer is entranced by the distant musical effect upon his mind of the thought and sound of a very soft chord, let us say, of D flat minor:

The object of both these artists will be to give their fellow men a taste of the heavenly and astonishing remoteness that these things had brought to their imagination. But if they present to us the mere ship or the mere chord, they cannot bring us to see or hear it. It

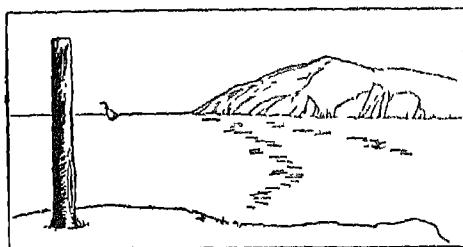



ILLUSTRATION 2

may be supposed that their first concern would therefore be to depict the contrast between the remote and the familiar. The artist might set up a homely, strong tree, or building, in his foreground (Illust. 2). The musician, in like manner, might strike a strong chord of C major and follow it at once by the contrasted faintness of his mysterious D flat minor:

and, if this be played and carefully listened to as if it were the first two bars of a Beethoven Symphony, scarcely any hearer will fail to observe how the effect of this remote thought is actually enhanced. But if the artist is bent upon gaining everyone's eye, ear or attention (even the more casual public eye and ear), one can imagine a symmetrical repetition of the near object might secure more attention, might impress and capture the wayward eye of

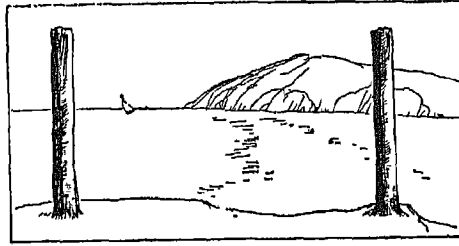



ILLUSTRATION 3

man to look twice upon the vision (Illust 3) and the musician's counterpart to this might be something of this kind

To go a step further, is there not such a thing, both in beauty seen and beauty heard, as a mental or imaginative momentum to be produced by many repetitions and by natural perspective in both cases? (Illust. 4).

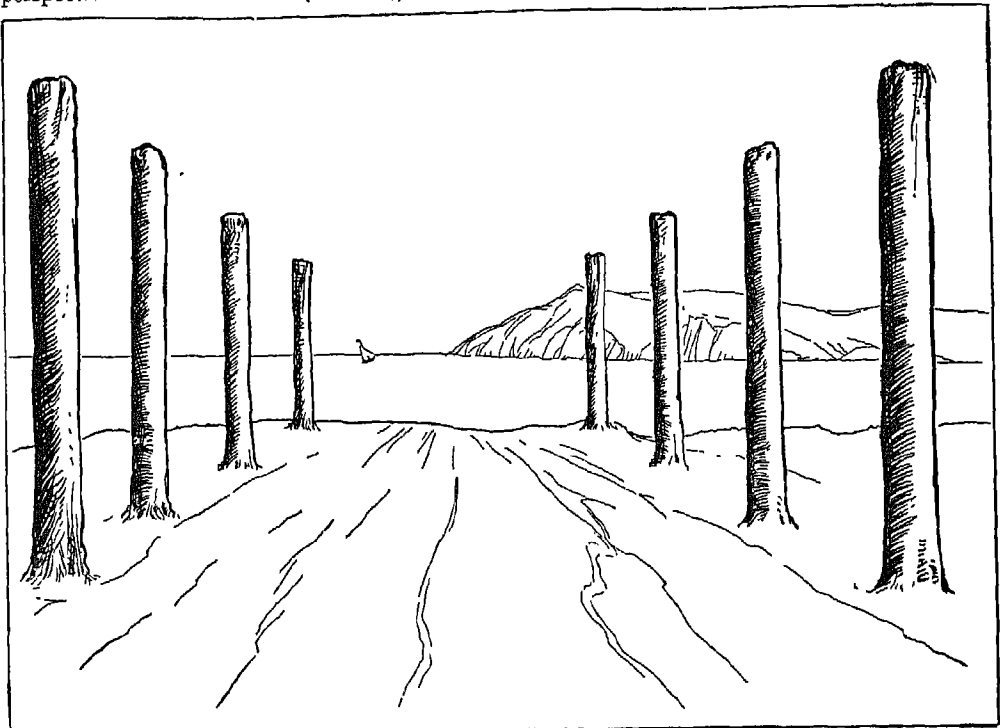



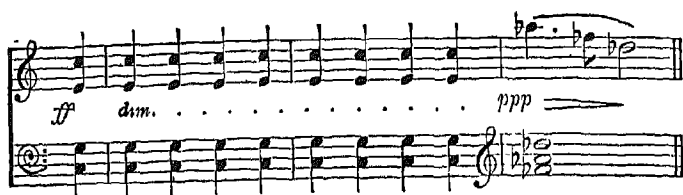
ILLUSTRATION 4

Such an effect is like the wonderful eloquence of many a cathedral or cloistral vista of pillars and arches growing fainter and smaller in perspective (Illust 5).

ILLUSTRATION 5. ST., PAOLO FUORI LE MURA, ROME

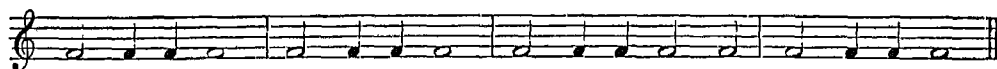
(*g*) **Use of the Ear, Voice, Eye and Hand in Class.**—We now reach perhaps the most pressing practical matter of all,—the correlation of ear, voice, eye, hand, whenever a musical phrase is to be *heard, sung, read, written, played*[1] (or all of these) in class. A moment's thought seems to make it clear that the more these things are thought of together and taught together, the more quickly they will all be mastered, linked up and banished into the background, giving the enjoyment of the actual music its rightful place. We have already seen how

[1] Whether on a real keyboard or on one of the many useful dumb models of keyboards now in use

many major problems there are in the teaching of music. The mere initial difficulties of training juvenile ears to hear a note, slender voices to sing that note, little eyes to read it, hands to write it and pick it out on the keyboard,—all these difficulties, taken together, sound indeed alarming; and one's natural inclination is to resort to teaching the five one at a time Yet, let but the musical mind of the class be mobilised and take command, and very soon the five acts of listening, singing, reading, writing and picking out (with one finger as we call it) on the keyboard will begin actually to fortify one another, bring absorbing interest and variety into play, and, so far from confusing the scholars, will tend to clear up difficulties, by reinforcing one another's appeal. For example, let it be supposed that a class of children of eight have easily been taught by ear to sing a complete hymn tune of the degree of difficulty of, let us say, the usual tune to "There is a green hill, far away"—really quite a hard tune to learn, with a big leap in it, and a modulation out of the scale, but yet one which many ordinary children of five or six seem able easily to master. To ask them to read it with their eyes, to write it with their hands, or to pick it out on the keyboard might seem quite beyond practical politics. They have shown they can do two things, use two faculties simultaneously, that is, they can listen and sing; but to read or write or play as well—that is supposed to be out of the question But is it really? True that of any 1,000 children, at least 950 will never play the piano well enough to forget all finger-difficulty in the thing they play. That needs a special digital facility granted to few, and it seems a pity that so many children who do not possess this facility should be compelled to try to learn to play Sonatas at all. True, also, that of any 1,000 children 950 have no better than ordinary good speaking voices. But they *need* nothing better for purposes of good class singing! If our little ones can easily learn at a very tender age "There is a green hill," with ear and voice, why not change our approach and give them a tune twice as easy and teach them to do it twice as thoroughly? Why not associate ear and voice and eye and hand from the first? This is the policy strongly recommended. Teachers who have adopted it seem to get a quick and sure result, and the following little series of hints on this score seem worth offering

(1) Let the children habitually see what they are singing.
(2) Hear what they are reading.
(3) Sing what they are writing.
(4) Sing and read what they pick out on the keyboard.

Above all, let eye and ear always be busy together, and, as far as practicable, let hand and voice join in often, so that eye, ear, hand and voice become from the first closely and unconsciously associated with the same experience and enjoyment of any tune the child is learning.

For example, take the following rhythm on a single note F:

Let the scholars

(1) Hear it.
(2) Sing it while they hear it.
(3) See it (written on the board or in their books) while they hear and sing it.
(4) Write it in their exercise books, singing it while they write it.
(5) Pick it out upon their little model keyboards while they sing it.

Next let them take three notes which make a common chord:

and hear them, sing them, read them, write them, play them on their model keyboard, till they know both the sound and sight of them and associate them completely. They will then be ready for the sound and the sight and the *feel* upon the keyboard of such simple tunes as this:

and the lesson will be singularly complete when they have had the fun of hearing and seeing their three familiar notes:

fall into the pattern of their rhythm.

(*h*) **Compass of Songs and Exercises.**—It is well in all early stages of rhythmic melody to use notes which lie within the easy *conversational* reach of the children's natural voices. Children most often speak somewhere round about middle C:

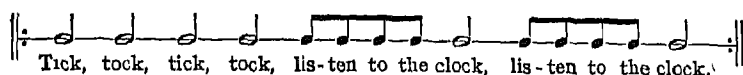
and while there is no need to restrict tunes to less than an octave in compass:

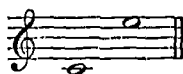
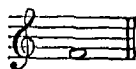
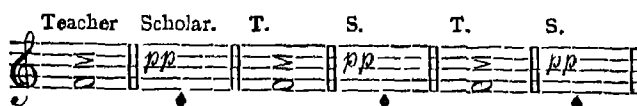
it is well to associate notes which lie nearest each other in the melodies first attempted. It is easy, later on, to range into the higher tones:

taking care that in all higher notes pure easy tones (usually spoken of as "headnotes") are used by all.

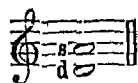
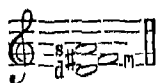
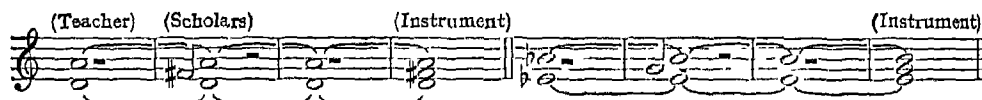
VIII. SPECIAL DIRECTIONS FOR THE USE OF THE LESSON NOTES

1. The Time-table evolved in the General Introduction and given at the end of it is by no means intended to be rigidly attempted It may or may not suit this or that teacher, scholar or class as it stands. It represents only one attempt to include the essentials, to be used, modified and improved till better be found.

2. The Lesson Notes that follow are also set down merely to be improved on the spot by individual teachers as they are used. It is suggested that one set lesson should be used one week, then followed by two free lessons (in the two following weeks) based upon the previous lesson but filling in deficiencies and expanding the material which seemed best to meet the needs of the class. When, for example, scholars are found lacking in the power to pitch their notes correctly, special exercises based on paragraph 3 below should be inserted. If their defective tuning is found to be a root of the trouble, special work should be put in on the lines indicated in paragraph 4 below. If timing and the sense of team-rhythm is markedly defective, rhythmic lines of poetry should be selected, or, better still, made up by the class, such as:

and a special five minutes' practice in rhythmic utterance inserted, till the children are able to get complete unanimity, from a mere whisper to a shout

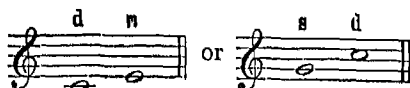
3. The vast majority of normal children are soon able without pains to pick up any note sounded within their natural compass.

But should one or more in a class show persistent defect in this rudimentary matter (a very small percentage are tone-deaf or "colour-blind" aurally) then special exercises must again be invented to suit the need. The symptom of such defects will be seen when any note.

is sounded, when probably the defective child will reply vaguely with another note altogether, with the following effect:

The cure for this is to change the note given, into the scholar's own defective note thus:

It will be found that it is an astonishment and pleasure to the handicapped child to find that the note it sings suddenly sounds right. When this has been done, it is a far easier step to bring the recognition of pitch to the defective receiver. The next stage is to lead the voice very gradually, step by step, up or down from its own note, thus.

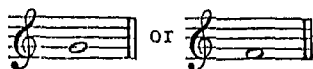
4. If any or all the scholars are persistently out of tune, the following special exercises will be found useful. (1) Sound any fairly low-lying note and its fifth.

and then ask the scholars to sing the major third (m):

The class can be taken one by one with this exercise. They will enjoy trying to excel, for after each attempt the teacher will sound the major third as it should be sung[1] thus:—

then the whole class will hear how much they are out of the true and will begin to "get the mental clutch in" and form the habit of listening and tuning on purpose,—the only radical cure (2) Adopt the plan of "target shooting" This is a good game for the whole class. It consists in setting up any note as target and letting all aim and hit, if they can, on the very true centre of each target-note sounded thus:—

[1] It should be remembered that nature's major third (vibration ratio 4 : 5) is flatter than that of equal temperament, hence the corrective value of this searching exercise.

The children's aim should be deliberate—careful yet carefree—and the note should not be prolonged. For it is the aim that matters, and the power of a strong certain aim at any given note is a permanent gain, and much enjoyed by the scholars.

5. The tune-writing record of each little one from the first should not be allowed to lapse In the first stages two safeguards may be needed: (1) The very little children may be unable at first to make up their tune on more than two notes Then it is safe to choose two such notes as:

taking care to let the child itself choose which note it will use and also when and how many times, and also encouraging it to end on doh, as the home-note or keynote, e.g

The tiniest little child will probably soon be grateful if the teacher encourages it to find a new note for the word star.

and if that note seems exactly right to the child as well as to the teacher, then a lesson for life will have been learnt. Encourage initiative in this matter from first to last, always allowing the children freely to use the "Rhythms and Phrases" of the week which they find in the lesson They should choose the ones they like and then find some they like still better It is probable that the faculty of choice will best be quickened by a question: "Which do you like best?" (2) Some slow-minded and slow-pencilled children may find it too much to copy their tune down on the stave The teacher should then let them write but one line or two of the *rhythm* of their tunes at first, and that on but one note, copying all the rest for them. The child should write in the spaces left for reply after "Rhythms and Phrases" (5) and (6) With these two safeguards there can hardly be a child who will not be able to rise, by the end of the first term, to making a simple, clean copy of its own small efforts Speaking generally, when any lesson or part of a lesson proves too hard for any of the children, recourse may always be had to *rhythming* everything in the lesson on one convenient note;

will nearly always serve. If the songs lack life at any one lesson, let the teacher fall back to *speaking* the lines in a lively, natural child's rhythm, passing forward again (the next week perhaps), to monotoning the rhythms—with the words, or with a vigorous *fa, la, la,*—and so on towards singing the complete lesson as it stands. Three weeks will probably suffice

for every set lesson, however hard it may seem at the outset; and if a quick-minded class should find any or all the lessons too easy to serve for three weeks, that class will thrive that finds more time to sing the songs they have themselves made up. They can still find a few moments to give to some favourite songs from any good school collection such as the *National Song Book*. Finally, specially gifted children can be encouraged to write their own tunes to the words of any of the songs set in the lesson. This can be splendid practice; especially should they be allowed to invent their very own rhythms for the various lines. There can be no such thing as a stereotyped rhythm The teacher should frequently remind the children that the notes of a well-sung tune can be as various in size as the shapely leaves of an oak.

A Lively Measure
From the painting by Seymour Lucas.

FIRST YEAR'S COURSE

OF

MUSIC

I.—ON THE SWING OF A TUNE

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

Set the children singing each of the above six rhythms, echoing after one another or after their teacher. For illustration tie any weighty object to a string, and set it swinging in sight of the class, making the children sing Fa la la la la la LA with the pendulum It is a good plan to let them breathe (or at all events stop) for one beat on the seventh swing, beginning again on the ninth and so on (see rhythm 1 above). Shorten the string from time to time, quickening the swing.

Let the children be guided to end their lines often on the keynote or home-note.

Notes for the scholar.†—Watch the swing of the weight on the string. Learn to sing exactly with the swing. You can sing to the syllables:—

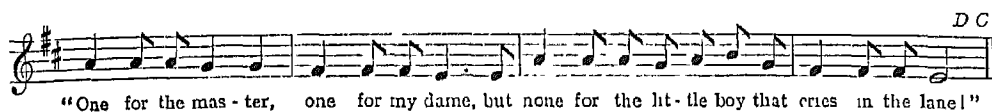
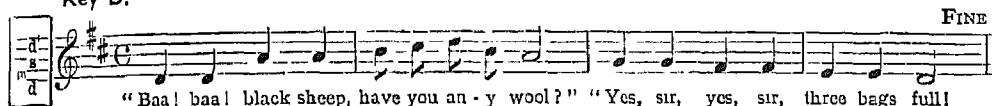
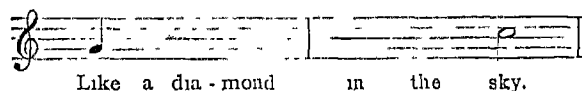
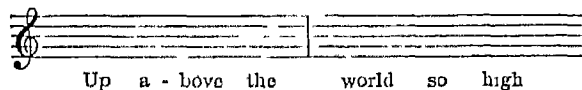
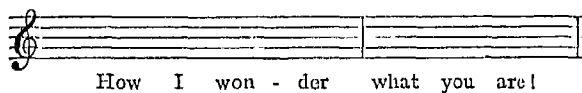
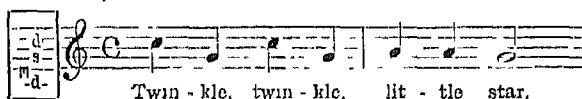
"*Swing, O swing, O piece of string*"—

* Space is left in each lesson for children to invent their own replies guided by the teacher In the earliest stages, mere echo will suffice, but the children should be encouraged to climb or fall to their home-note

† Only these notes are reproduced in the *Four Melody Books* published separately.

Then you can sing with a shorter string's quicker swing

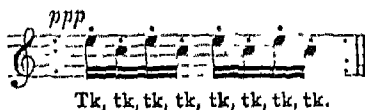
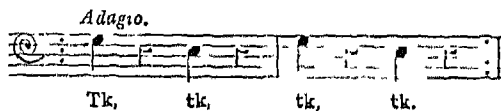
"Ev'ry song will have a swing"

SONG—BAA! BAA! BLACK SHEEP

SCHOLAR'S OWN TUNE*

*For very young children, let repetition of the first line of the tune suffice till the final line. Let them invent some new phrase from the word 'like', starting on G, to the word 'sky', ending on the keynote.

II.—ON THE TICK OF A CLOCK AND THE TREAD OF A TUNE

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

Facts to get through to the children: (1) That clock times are always regular, they never stop for breath; they never get, or give, a moment's rest; and they never make a pretty pattern. They are mechanical, and rather like railings round a park, not like hedges or trees. (2) That some ticks are very rapid, like a little wrist watch:

some very slow, like Big Ben:

and the speeds of other clocks are between the two. (3) That the one is like children treading lightly and quickly on tip-toe, while the other is like a very old man slow marching. (4) That a watch tick-ticks regularly because it can't help it; but we humans can "tread-tread" regularly as we wish, and when we wish. "Now then, children, practise ticking like a clock; at different rates ' on purpose'." After making the children *tick* aloud together, let them march round the room at fitting paces till they love being quite regular and quite together.

Notes for the scholar.—A clock ticks regularly because it is wound up and cannot help doing it.

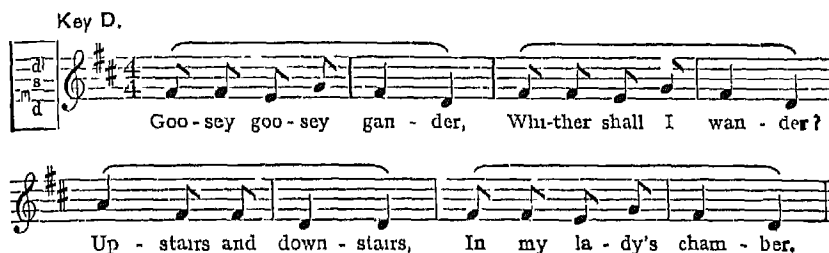
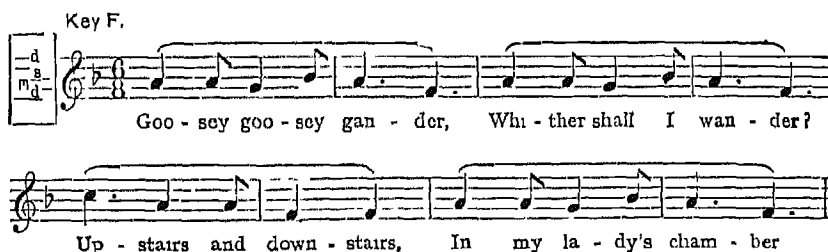
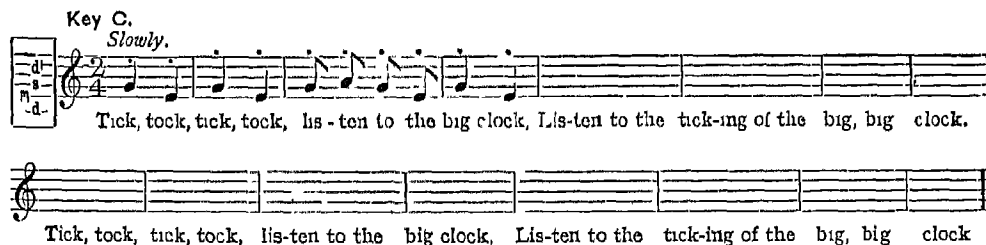
Can you keep as regular as a watch or a clock on purpose, and all together?

Try over and over again till you can all do it so well together that it sounds like one clock·
tk, tk, tk, tk.

Then tread together softly: -d- Tread, tread, tread, tread.

on tip-toe round the room The ticks and the treads will help you to keep the swing of a tune.

SONG—GOOSEY GOOSEY GANDER

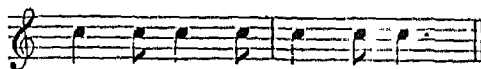
A goosey version, to be sung in a slow, waddling manner.

A dancey version, to be sung quickly

SCHOLAR'S OWN TUNE *

* Let the children use the third bar of the tune fairly often It can be used with very young children in bars 5, 6, 11, 13, and 14. Older children will have both the wish and the ingenuity to invent varied phrases for these bars

III. ON TROTTING TUNES

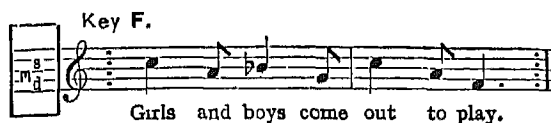
RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

Following up the clock-and-tread lesson, the teacher may here develop the power of the class to imitate the dry, soft, whispered *tk, tk, tk, tk, tk, tk, tk, tk*, of a wrist watch, and then translate it into very quiet tiptoe, trotting round the room or playground. The two should be happily connected in the mind of the children, the aim being to move absolutely together, with the spirit of *give and take* guiding them—all bent on watching one another, Tommy watching Johnny's lips, and Johnny watching Jimmy's lips, and all the class determined to 'tick' together. Soft singing of the tune may be coupled with the trotting; or half the team may trot while the other half sing with them, watching their footfall.

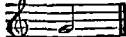
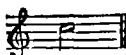
To these lessons should be added a skipping lesson in this rhythm:

Notes for the scholar.—Trotting Tunes seem to fit *quavers*.
What are quavers?
Here they are, sing them:

You can tread like soldiers marching to *crotchets*.
What are crotchets?
Here they are:

You can skip to crotchets and quavers.

SONG—WHAT IS TOMMY RUNNING FOR? *

Groups of tied quavers and semiquavers, etc (with words printed underneath the proper notes) are used in the *Refrains* and *Fa Las* in order to train the eye of the young singer to this convenient method of noting and realising the rhythmic groups within a bar, as well as to pave the way for the easier reading of instrumental music, when the time comes

In all other cases the ordinary plan of noting music with words is used, separating each note from each according to the syllables

(See also Songs to Lessons 8, 10 and 12)

Other names, Johnny, Harry, etc, may be added and the children may be allowed to run after one another as their names are called.

SCHOLAR'S OWN TUNE †

A Trotting Tune to be sung to fa la la or any syllables chosen by the children or by the teacher.

* Derived from Kate Greenaway's "Under the Window."

† This tune can contain much repetition. Let the children be encouraged to get to [musical notation] in the 8th bar; and they should try to end their journey in the last bar on [musical notation] rather than on the lower key-note.

IV. ON DANCING TUNES AND LULLABY TUNES

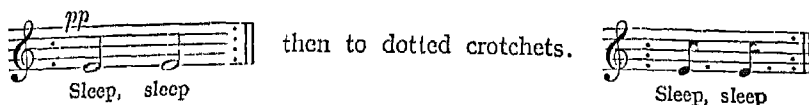
RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

Here the teacher can develop the skipping rhythms started in the last lesson If able, even the smallest children should, during the weeks that follow, be given opportunity to develop their own little dance figures, both in the customary triple or skipping time·

and in the duple time of two crotchets in a bar which allows of such patterns as are indicated by the order given· *trot four, trot four, hurry four and hold,* thus:

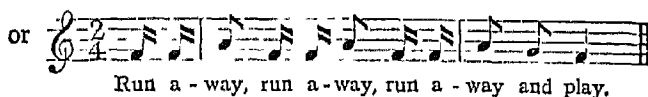
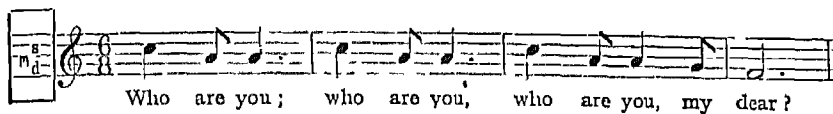
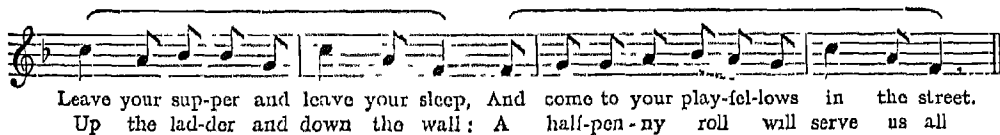
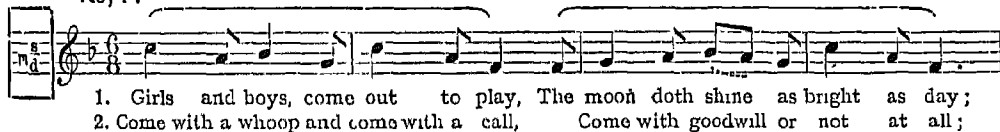
or *run for two, trot three,* thus:

It is well to go straight from dancing rhythms to lullaby rhythms Let the children sit, and even shut their eyes, holding an imaginary baby in their arms, and let them sing the word "sleep, sleep" to minims:

They will then be ready very restfully to sing the lullaby set below, or a lullaby of their own making.

Notes for the scholar.—Say *Run away, run away, run away and play* many times together, and see if it makes a dancey sound.

Now say *Go along, go along, go along, the road* many times and see if it makes a good dancey sound too.

Now say *Who are you, who are you, who are you, my dear?*

Then make up nice tuney songs to them, like these:

SONG—GIRLS AND BOYS, COME OUT TO PLAY

SONG—SLEEP, LITTLE ONE, SLEEP

SCHOLAR'S OWN TUNES*

*In all these earlier Scholar's own tunes, the simple device of repetition may freely and continually be used, the teacher helping the child to rest at the half-way house for a note or a beat, and to bring the tune to the key-note or home-note at the end thus, for example —

This in itself is a satisfactorily complete tune; its monotony after a time will be useful in making the children wish for and think of ways of making it more of an adventure, and altogether more interesting, as for example by these few alterations —

It will be seen that all that has happened is that the same rhythm has pushed its way gradually up to the top key-note and then "run home" just in time to use the very same last four notes for walking sedately back to the home-note The children will readily understand and enter into this

SPECIAL ILLUSTRATION FOR USE WITH LESSON XII.

KEYBOARD WITH CHILD'S HAND

This Model is in use at East Lane School, Wembley, and is included here by kind permission of the Headmaster.

V. ON TUNE PLANNING AND THE "RULE OF FOUR"

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

In the first four lesson notes and songs, many phrases or fragments of music will be found that can be made the starting point for planning a tune with the whole class For example·

Let the children sing this fragment through Then show them that it is a good plan to find out the rhythm behind this or any such phrase:

and when they have got it safely into their minds and voices, lay down a plan consisting of this rhythm four times over Remind them that a room has four walls, and a table or a horse four legs, and though you can have other shapes of rooms and tables, and even animals, yet a really good plan for a tune is the four-plan.

Stick to the Rule of Four for some time When they have sung the rhythm through four times on end, perhaps clapping their hands together on the first strong beat (the first quaver

of each of the four phrases), they will be ready to make up little tuney phrases of their own on the rhythm—the same rhythm all four times, but with different ups and downs, thus:

altering the end a little, for fun and for finish.

Notes for the scholar.—Most rooms have four walls. Most tables have four legs. Most cars have four wheels. It is good to plan tunes with four phrases:

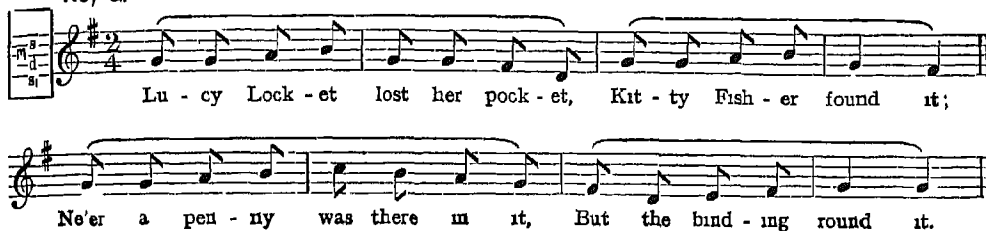
SONG—HUSH-A-BYE, BABY

SCHOLAR'S OWN TUNE

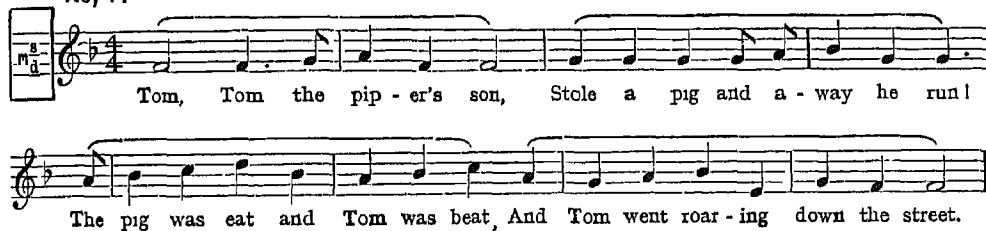
VI. ON BALANCING

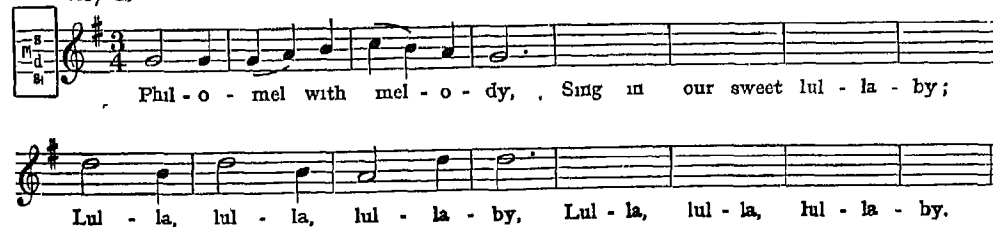
RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

Not the smallest tune in music exists without *Balance of parts*, especially shown in *Balance of rhythmic phrases*. Children will respond to the idea of balance from the very earliest ages. Point out the balanced appearance of any ornaments round the room, especially on chimney pieces, ornamental chairs, sideboards or cupboards. Then point out the balance of our bodies, arm with arm, two eyes with one another, two ears, etc , and remind them how we should pity a deformed body with but one leg or one arm. From this it is easy to pass to the rhythms and phrases of the simplest kind, and ask the children to balance every phrase by singing each of them twice, then passing on. They can *sing* balanced little phrases even while setting up an avenue of toy bricks of various sizes, matching each brick with one-bar, two-bar, or four-bar phrases, according to their size. Continually revert to this lesson till all the children are fully accustomed to the idea, experience, and habit of balancing in melody as a matter of course. This is the first step to tune writing.

To make it a vital part of their thoughts about music, cause the little children to wave their left hand in quiet gesture for each first phrase, and then wave the right exactly with the balancing phrase; or they can step upon their left foot for the first phrase, and to the corresponding right side for the answer. Any such simple devices will help to make this immensely important matter of balancing so clear that they will never lose it.

Notes for the scholar.—Look at the mantelpiece, or at any ornament in the room, or at a tree out of the window, or at a man, and try to find two parts that match each other, one on each side. Then listen to No. 1 Phrase and see if No. 2 matches it well. Then point to the left side of the mantelpiece when you sing No. 1 and to the right of it when you sing No 2 Then you will have found out *balance*. Balance all your musical thoughts, and you will have

more fun and enjoy it all perhaps twice as much just because you are able to balance one bit of tune with the next bit of tune. After that you will find it very easy to write tunes, balancing and keeping the rule of four.

SONG—LUCY LOCKET

SONG—TOM, TOM THE PIPER'S SON

SCHOLAR'S OWN TUNE

VII. ON WORDS THAT SING

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

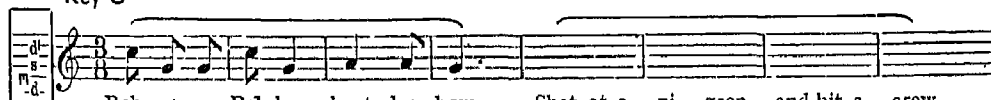
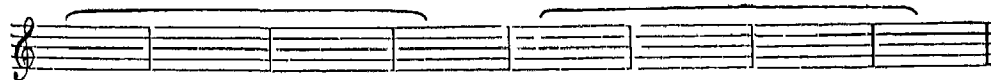
From the first, the approach to pure melody through words uttered together is likely to be the quickest and most practical way of release for the children's own love of rhythm, and for the quickening of their interest in the rise and fall of melody, as well as in the rounding off of a tune which must now begin to dawn upon them. Adopt the following order of approach: (1) One child says the words aloud (as for example): "Here we go round the mulberry bush"; (2) All children say it heartily together; (3) All say it to an approximate rhythm, (4) All monotone it to the rhythm on a convenient note (doh or soh of a future key):

(5) At last all sing it to the actual tune of the piece:

These five processes in the same order can be adopted with every tune, whether a set song or one of which the children themselves are about to supply part, or the whole of the melody

Notes for the scholar.—Some words seem only to talk, and some words seem to sing of themselves. "May I have a piece of bread if you please?" is rather talking. "*This* is the *way* we *clap* our *hands*" is more tuney. When words sound tuney like that, then try to make up a bit of tune to fit them.

SONG—THE MULBERRY BUSH

SCHOLAR'S OWN TUNE

VIII. ON TUNES THAT FIT LIKE A GLOVE

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

This should carry the last lesson's work a stage further, and the teacher can give the children a "cross-country run" through simple poems, line after line, in the poetry sections of these books It is well to monotone the lines (on F or G) and to do this in a markedly rhythmic way. Then let the class turn any suitable lines (that seem to fall into a good unanimous rhythmic lilt) into scraps of melody, potential lines for four-lined tunes When the children agree that their line of melody fits the words "like a glove" it is easy to make four-lined tunes by repeating the words four times, or, if a good couplet be found, by repeating them twice.

Notes for the scholar.—Directly you have found a line of poetry that fits a line of tune as a glove fits a hand, then you can begin to make up a four-lined tune on those words. At first make it all very plain, then begin to enjoy it and make it more venturesome, like this:

Words that ring and sing and fit like a glove are great fun for tune-building.

SONG—DICKORY, DICKORY, DOCK

SONG—LAVENDER'S BLUE

SCHOLAR'S OWN TUNE*

*The class should speak and monotone and then tune up these syllables till they find the very best fit they can.

IX. ON EIGHT NEIGHBOURLY BELLS

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

It is suggested that, in teaching the natural major scale, the children should be interested in "eight bells"—imaginary or real. If there is a complete peal of bells in a church near by let the children sing with the bells whenever possible. The teacher or a pupil can imitate the eight bells on a keyboard, and let the children pretend their voices are bells. In this lesson numbers may well take the place of the usual solfa syllables thus:

Secondly, get the children to think a strong accent on Nos. 5 and 1!

This will gradually throw the eight bells into two bars of common time in their minds with the chief accent always on 1. Next halve the scales for some time:

followed by:

Then pick out·

for special peals of three bells, "*Ding Dong bell!*" Gradually get the children ready to give out any number-bell that is asked for by its number. Then intervals in any order will easily follow:

After such practice, the children should be ready to sing any peal that is given to them

Notes for the scholar.—Pretend you are chiming eight bells over and over again from top to bottom: 8765432187654321—till you are clever at it. Then be ready to sing any numbers asked for.

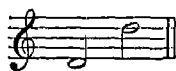
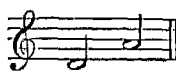
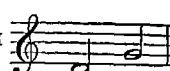
SONG—PEALING BELLS

SCHOLAR'S OWN TUNE

X. ON THREE PERFECT LEAPS *

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

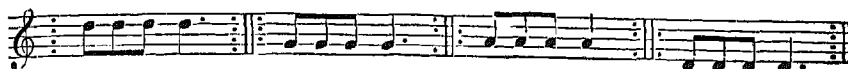
The perfect leaps are of course the OCTAVE, and FIFTH and FOURTH

It is better to teach the children these familiar perfect intervals in a little rhythm, as for example,

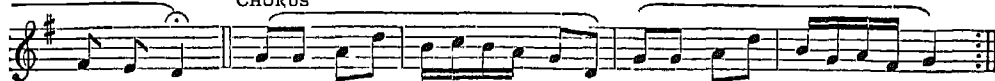
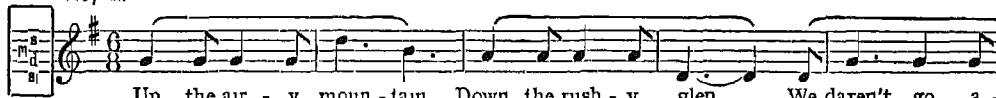
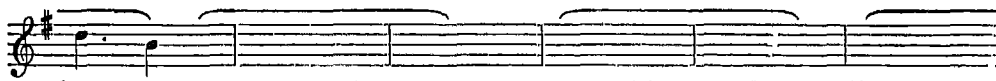
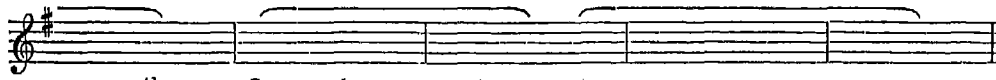
until they all get to know them easily by sound and by name Nothing perhaps can help them more than familiarity with the skeleton scale which includes these three intervals, reckoned from any low note

The songs as well as the Rhythms and Phrases in this lesson have all been chosen to make the children used to this special framework If in the first year's work they can think and sing these intervals and this formula firmly and accurately, a foundation for all future work is secure.

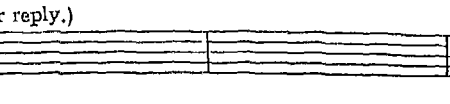
* This is the hardest lesson of the year and should therefore cover many weeks with supplementary practice bearing upon the three perfect leaps

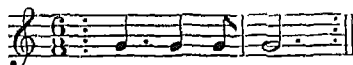
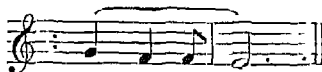
Notes for the scholar.—Sing Rhythms that you like on these four notes:

Then for a change sing them in this order,

and you will soon begin to conquer the three perfect leaps in music.

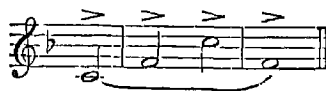
SONG—STRAWBERRY FAIR *

SCHOLAR'S OWN TUNE

* Included by kind permission of Miss Karpeles and Messrs J Curwen & Sons, Ltd

XI. ON READING TUNES ON THE STAVE

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

The first step towards reading is of course taken unconsciously. Let the children from first to last *look* at the phrases they sing while singing them. The eye and the ear should be allowed habitually to work together in this way. But the first conscious efforts to master reading should first be centred upon the rhythm of the phrase, then upon the shape (of the rise and fall) made by the heads of the notes on the stave. This, for example,

when the mere rhythm has grown familiar to the eye, can lead to this,

giving rhythm and the shape of going *down* stairs, step by step. Let the children hear what they are looking at and sing it,—hear it and sing it, hear it and sing it,—looking steadfastly at it the while. As little as possible should be said during the first year as to the details of note values. Let the look of the rhythm on the page, and the shape or lean of the notes on the stave make their own impression. But make the child anchor its mind and voice on the keynote and its fifth,—in the case of a tune lying between its two keynotes* thus,

* Called in the old days an authentic melody

and in the case of its lying between its fifths* or dominants (between soh and soh) thus:

Note for the scholar.—Here is a rule which you can sing over and over again to yourself:

SONG—THREE BLIND MICE

SCHOLAR'S OWN TUNE

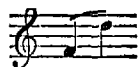
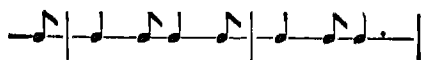
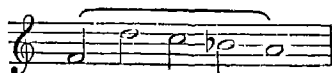
* Called in the old days a plagal melody

XII. ON PICKING OUT TUNES ON THE KEYBOARD

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

It is a great advantage if each child has either a home-made or other model baby-keyboard of about ten notes or so. This enables the children to *associate the sounds of notes, intervals, rhythms and phrases with the look of the keys.* It is not necessary to have in the room more than one keyboard that actually sounds the notes. The rest may well be dumb. (If they are not, care must be taken that all are in tune with one another) The methods to be adopted are.—(1) *Touch the note you sing.* (2) Touch the *interval* to be sung (3) Pick off the *rhythm* to be sung (on one note of course). (4) Pick out the very notes of the phrase to be sung and put them into the rhythm. As an example of these four steps take the first phrase of "I saw three ships," (1) Touch F·

and sing it (2) Touch the difficult interval F to D:

and sing it many times. (3) Pick off the rhythm of the lines thus.

on the starting note only. (4) Pick out the very notes of the phrase:

and then try to pick them out *in* the rhythm:

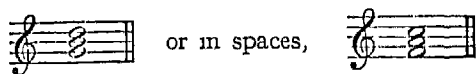
Restrict practice of this for the very little ones at first to one easy line such as those given in the Rhythms and Phrases for this week It is always well to let them pick out in this way well-known phrases of which they are fond.

Notes for the scholar.—TO MAKE FRIENDS WITH THE KEYBOARD. *First find "Middle C,"* and then your chief friends are the notes that lie to the right of this. When you want to pick out a tuney bit, first find your starting note. Then find the hardest leaps in the tune and try to make sure of them. Next rap out the rhythm *on the starting note.* Then you will be ready to try to pick out the tuney bit complete.

SONG—I SAW THREE SHIPS

SCHOLAR'S OWN TUNE

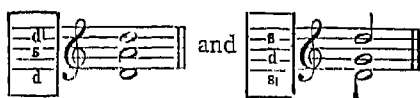
NOTE AS TO USE OF SOLFA SYLLABLES

AT the present day Curwen's excellent Solfa system is widely used Yet its use together with the Staff is unfortunately not established. It is strange that the Solfa syllables at present actually are in danger of being both too advanced and too rudimentary for the average child. This apparent paradox seems to have arisen from the popular use of the two systems (the Staff and the Solfa) in water-tight compartments. Thus, any little child set down to spell out from the Staff tiny tunes on the piano gazes at a chord on the Staff, whether on lines,

and gradually comes to associate this shape (or diagram) on the page with the homely and pleasant sound of a chord to its ears, and with the tolerably easy task of picking out on the keys the three notes that make the chord with the first, third and fifth fingers of the right hand Now to such a little one who is already *experiencing* chords, the mental significance of the Solfa syllables is momentarily too advanced, while the need of syllables for mere reading purposes has been left behind. Confusion is brought about, and needless complexity, by separating the two systems and trying to make both complete without each other. Similarly, starting at the other angle, a child who has never seen the Staff, but has been brought up on the modulator (never having known the look of the common chord on the Staff) will find that its sudden addition is as difficult as the arrival of a new language. The eye has accepted one set of symbols and got used to them. When, having done this, it is called upon to approach another set of symbols, *through* the old ones, it is in reality not only required to learn a new language, but to collate two languages simultaneously—to learn in fact to translate. Thus it will be seen to be true (on both sides of the fence, so to speak) that a child brought up on the modulator finds the Staff too advanced, while the child brought up on the Staff finds the syllables too advanced.

It is not unnatural that there are people on both sides who, impatient of this complication of two sets of symbols in the early stages, become partial, and cling tenaciously to the use of one or other alone Yet those who cling to the Staff alone cannot be unaware of the convenience and splendid educational aid of the syllables, which give permanent names to relations, whether as used by Guido a thousand years ago or by the followers of Curwen to-day. Those, on the other hand, who would advocate exclusive use of Solfa, are in even worse case, since all the musical masterpieces of the world are printed in Staff and cannot be available in Solfa. But why should not the Staff-reading instrumentalist have the advantages of the Solfa choralist, who attains an immediate and true picture of the relations of notes, and, with this, the power to tune his mind and voice together with greater intelligence and precision? And why should not the Solfaist, for his part, have the advantages of knowing, from the very first kindergarten lesson, the sight of the Staff through which he is ultimately to gain the freedom of the whole City of Music?

Two things seem clear (1) that the water-tight use of either system is to be avoided at *all* stages and (2) that the concurrent use and blending of both from the very first lesson onwards really is practical politics even with the smallest children

The notes prepared for these lessons have been based on these two assumptions. They may be used by teachers who have already worked with the modulator, and who may have already made the smallest children familiar with the names of all seven natural notes of the scale. But they are also adapted for the use of teachers who have begun with the Staff, and have not yet used syllables, whose children in the infant stages have been used to the look of a natural chord and a scale and perhaps a simple tune on the stave itself, or perchance have been taught to play with miniature or model notes on model staves—an excellent scheme for interesting the infant in reading and writing later on. It is urged that teachers of all persuasions should not press the syllables upon the children at all until the first lesson of the second year *Let them tap rhythms and sing tunes in abundance (and make up little rhythms and tunes) intuitively, by ear and by sight of the notes they hear* The attempt made here to serve teachers of two traditions was necessary, but may not prove completely helpful to both at once; and the co-operation of teachers one and all is earnestly sought to remedy shortcomings in any subsequent edition. It may be found that the immediate picture, for example, of "*Baa! baa! black sheep*" in the Staff is rather laboriously acquired by the child who is already able to spell it out on a modulator. The individual teacher will best know how to deal with such a contingency Speaking generally, experience seems to suggest the wisdom of letting all very young children sing such a song as *Baa! baa! black sheep* "by ear" as it is called, *but always with the picture of the tune (as the notes stand on the Staff) before its eyes while the tune is going on.*

From the first lesson of the Second Year onwards attempt has been made carefully to unify the methods, both for the Staff brought-up and for the Solfa brought-up child. If the Staff-child is at an advantage in the stages provided for in the First Year's Course, the Solfa-child is at a still greater advantage in the Second Year's Course; for the fixing of the two anchors

and of the Common chord:

and of the hexachord:

in their strong natural places for the musical thinker will perhaps seem child's play to the habitual Solfaist.*

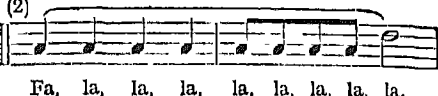
It is important for teachers to realise that the child mind needs to acquire, and that at the earliest possible moment, the power of real centrality of thought on a very simple scale;

* While urging the use of the Staff from the first lesson and always, the writer would like here to avow a growing and complete personal faith in the system of syllables, both as first used by Guido, and as expounded and extended by Curwen, for use with the stave Actuated by this faith it is indeed possible to foresee a day, not too far distant, when all the wonders and beauties of enharmonic modulation (in such works as Schubert's Unfinished Symphony for example) will be capable of being expressed, explained and appreciated in terms of an extended Solfa system

and it is for this the syllables are so useful. It is here assumed that, during the whole of the second year of a four years' course, the lessons will generally concentrate upon the customary major scale, and therefore the centrality of the note called *DOH* will be paramount for a year. This does not mean that any note may not be used as a temporary centre of a "tuney" thought at any moment; but the mind should (through all experiences) be brought carefully to centralise "on purpose" upon *DOH* as "King of the Castle." The logical development from this point will necessarily be in the hands of individual teachers. Some gifted children will be ready very soon, not only to think the six complete chords referred to in the Introduction:

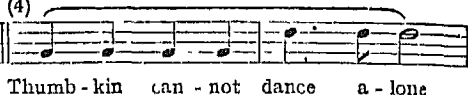
but will very early be able to enjoy thinking of *RAY* and the *ray* chord, *ME* and the *me* chord, *LAH* and the *lah* chord, as three possible attendant key-centres round *DOH*. As soon as they do this, they are preparing the ground for a more comprehensive understanding of modulation than has hitherto been possible; and it should be here noted that all the modulations of the classical periods group themselves round these six chords

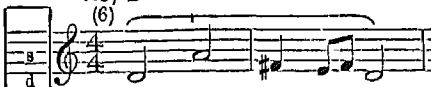
While appreciating the value of *LAH* minor as the ruling chord of the minor key, the writer finds it impossible to give assent to its common use among Solfaists as the *sole* representative of the minor mode in the case of attendant keys grouped round a central tonic, and modulating from and to that centre, for in order to grasp the true principle of centralisation of the key of the tonic, one must realise that *ray minor* and *me minor* are at hand both as attendant minor keys, as shown in the following slender example:

Here palpably at the 2nd and 3rd and the 6th and 7th bars, *ray minor* and *me minor* respectively become temporary centres of thought. Neither can with truth be called *lah minor!*

But key-centralisation upon *DOH* must never degenerate into a rigid tyranny of *DOH*. This has been a dominating danger, and hampered music for a century past. The reviving enjoyment of the modal values of *ray minor* and *me minor* should soon be available for every child. Centuries of history lie behind their use, and though, during the marvellous key development of the eighteenth and nineteenth centuries, it seemed as if the twin major and minor keys had quite and for ever superseded the modes, their inherent vitality and their natural functions as subtle vehicles of human thought will assuredly lead to an increasing and enlightened return to their use, and that with no utilitarian restrictions to fetter them

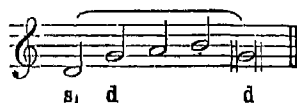
SECOND YEAR'S COURSE

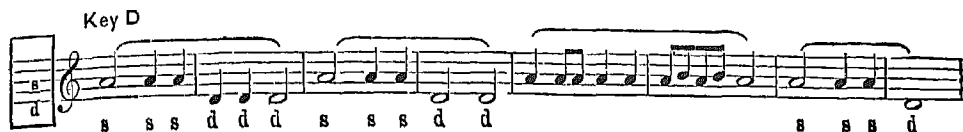
OF

MUSIC

XIII. ON TUNES ON FOUR NOTES

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

Let the children now begin to think of notes as if they were persons, related to one another in important ways. At this lesson two of the solfa syllable names should be used in good earnest, but if possible only two'—(1) the keynote, DOH (or "King Doh"), and (2) his "Prime Minister," SOH. For tune purposes let the children *choose* two other attendant notes (for example A and B)—

but it is suggested that, if possible, the teacher should avoid (for the time) giving the other notes their usual solfa names. Keep them as chosen attendants *that lie near* the "King" and are, as it were, fond of him, whose titles and names the children will find out later on. If the children thus concentrate for some time upon setting up DOH as the chief of all their major keys, with SOH as his chief of staff, or stalwart companion, the basis for secure melodising, and the love and understanding of chords and of the common system of musical thought, called key, will be the more quickly secured. Show them, during this and subsequent lessons the *two ways* in which SOH helps DOH to make fine tunes (1) by standing between two Dohs (see Phrases 1 and 2 above) and (2) by standing "on guard" each side of "King Doh " See also Phrases 3 and 4 and Tunes of the Week.)

Notes for the scholar.—You could write a tune on three notes, like this·

Or like this:

But it is better fun to have four notes. Make great friends with the "King of the Castle" called *Doh,* and his chief *Soh,* and you will soon find two other friendly notes near them to make up a jolly tune. Let the last line of all your tunes end on *Doh.*

SONG—DANCE, THUMBKIN, DANCE

(Keeping each finger in motion as its turn comes)

Key G

1. Dance, Thumb-kin, dance, Dance, Thumb-kin, dance, Thumb-kin can-not
2. Dance, Fore-man, dance, Dance, Fore-man, dance, Fore-man can-not
3. Dance, Middle-man, dance, Dance, Middle-man, dance, Middle-man can not
4. Dance, Ring-man, dance, Dance, Ring-man, dance; Ring-man can-not
5. Dance, Little-man, dance, Dance, Little-man, dance, Little-man can-not

dance a-lone, So dance ye mer-ry men ev-'ry one, And dance, {Thumb-kin, / Fore-man, / Middle-man, / Ring-man, / Little-man,} dance!

Key G

Lit-tle wind, blow on the hill-top, Lit-tle wind, blow down the plain,

Lit-tle wind, blow up the sun-shine, Lit-tle wind, blow off the rain.

SCHOLAR'S OWN TUNE*

Key G

Good mor-row to you, Val-en-tine! Curl your locks as I do mine;

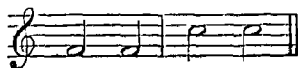
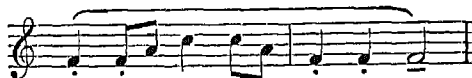
Two be-fore and three be-hind, Good mor-row to you, Val-en-tine!

* For helping the writing out of the children's tunes in their books, see Lesson Twenty-four

XIV. ON WORKING ON A FIVE-NOTE SCALE

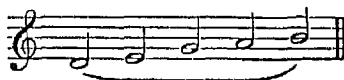
RHYTHMS AND PHRASES FOR THE LESSON

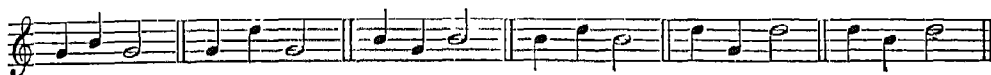
TEACHING NOTES

In this lesson, the children, already familiar with *DOH* and *SOH*, should be given *ME* to play with. Singing such a *DOH-SOH* phrase as the following:

two or three times will prepare them to enjoy filling in the major third in their own little rhythms thus:

There is danger that the children's minds will soon petrify, as it were, upon the common chord in a way that will make it difficult for them to read melody groups using other notes Care should be taken therefore to associate these three notes persistently with notes that lie near them. The use of so-called passing-notes and grace-notes is most handy at this stage (compare phrases 5 and 6 above) Any chord-phrase invented should quickly be associated with graceful and flexible melodising groups of all these free notes (see phrase 4 above). When once the children have found out the pleasure of "gracing" the three chief notes, it will be easy to suggest to them the fun of writing five-note tunes. The following is the five-note scale to be recommended in all the early stages:

It is likely that, in developing this lesson, a teacher will find it possible, even in these early stages, to teach the scholars to write tunes on these same five notes in a different order, thus:

making D (or any other note that they choose) the chief note of their tune.

In completing their own tune (Little Boy Blue), each child may choose any two extra notes for the five-note tune, but it may be wise for the teacher to encourage them to choose the note above *DOH* and the note above *SOH* in preference to any others, and if one child (perhaps with a deep voice) chooses to write its tune in a low-lying register, it should be greatly encouraged to write it in the scale:

Notes for the scholar.—Here is a lovely chord:

Think of the three notes that make this chord *by name*. Then sing them to yourself, in all the ways you can think of:

There are hundreds of ways in which you can sing them to yourself

When you have done this for some time, think of any two other notes that will go well with them Then you will have five to play with. You need not give the two visitors names just yet.* Find them with your voice, or on the keyboard, and join them in your minds with your three chord-notes. Then you will be able to make five-note tunes on the three notes you are thinking with their two visitors who have dropped in to see them, a happy family of five friendly notes.

* It is very important that the children should not be involved in any unnecessary effort to sing some notes to syllables and other notes to words or la-la-la The syllables are for *preparatory* use, to fix the thought of the chord and to give it a permanent name, and for *corrective* use, should the conception of the chord for the time being become obscured and need renewal From the first moment, therefore, melodic phrases should be sung either to the words from which they have arisen or to any uniform sound entirely without words or syllables This will tend to give the children a completely musical experience of each melodic curve The importance of this to the child can scarcely be over-estimated. It will be easy for the teacher, at any moment, to bring the syllables to bear upon a difficult phrase, to illumine or clear it up, and then to go on as before.

SONG—COCK ROBIN

SCHOLAR'S OWN TUNE

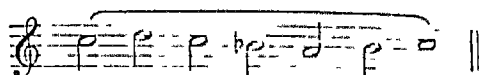
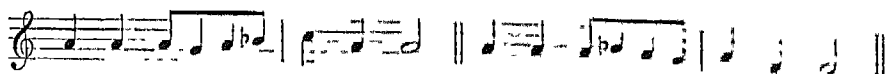
ANOTHER VERSION

XV. THE KEYNOTE TAKES COMMAND

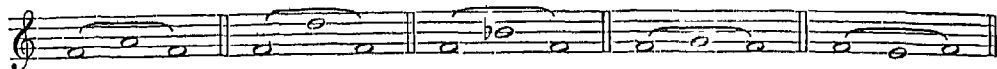
RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

In this lesson the child will be filled with the idea of relating all the sounds that it makes to a central note. For this reason each note of the scale will be given its name and related to its "commander" (see phrases 1 to 4 above). When the children have thoroughly related each member of the scale as indicated above to the oft-repeated keynote, it will be well to let them relate the members of the scale to each other. The scale should be to them exactly like a family party where every guest has been introduced to the head of the family. They go their various ways, making friends and playing games with each other in groups. Phrases 5 and 6 above are framed with this in mind and should receive corresponding answers from the children.

The following group round *SOH* is important:

and the following groups round *ME* should also be commended to the children:

But there is really no end to the beautiful phrases that can be made by groupings, of the children's own invention, provided they only use the lower *TE*, attached to the "Master of the House," and are not required to sing the upper *TE*, which introduces the dangers of the three rising tones from *FA* (B flat).

Notes for the scholar.—Now that you have learnt to know the notes of the chord by name it will be easy to learn the names of the rest of the scale-family. Here they all are, talking to their keynote (in phrases 1 to 4) Sing these, or play them on the keyboard, till you feel that you love the sound of them all and would know each note by name if you heard it with its keynote. In your tunes you will find many ways of making them stand in groups and talk to each other (as in phrases 5 and 6).

It is good fun if two of you get together and agree upon *DOH* and then try to puzzle each other, seeing which can guess quickest the name of the note the other sings; like this:

When you play this game always end up with *DOH*. What are the right answers to all these? If you really can't say, ask someone to help you till you know them all in the world of sound just as quickly as you know people and things in the world of sight.

SONG—THE LARK

Key G

A - lou - et - te, gen - tle lit - tle sky - lark, A - lou - et - te,

I will plume you now; I will plume you on your head, I will plume you on your head,

On your head, on your head, Oh! A - lou - et - te,

D S after verse 1. *Last time*

pret - ty lit - tle sky - lark, Gen - tle sky - lark, I will plume you now DS 1.

SCHOLAR'S OWN TUNE

Key F.

The rose is red, the vi - o-let's blue, Pinks are sweet, and so are you.

The rose is red, the vi - o - let's blue, Pinks are sweet, and so are you

*Subsequent Verses eyes nose beak teeth beard neck back teet brow

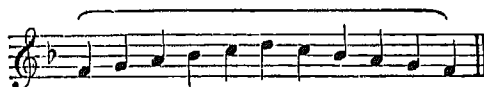
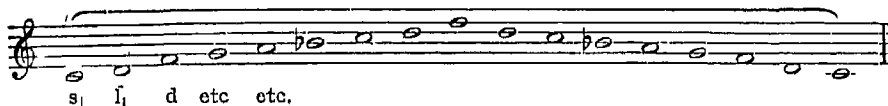
† Always repeat backwards through the previous verses thus

3 On your eyes, on your eyes,
2. On your brow, on your brow,
1 On your head, on your head, Oh! etc.

XVI. ON A SIX-NOTE SCALE

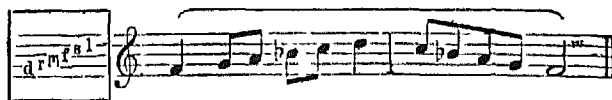
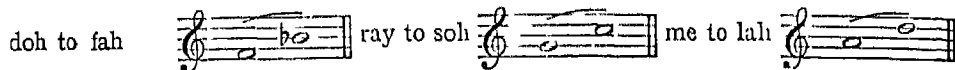
RHYTHMS AND PHRASES FOR THE LESSON

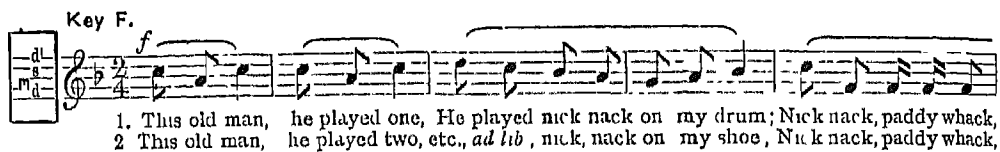
TEACHING NOTES

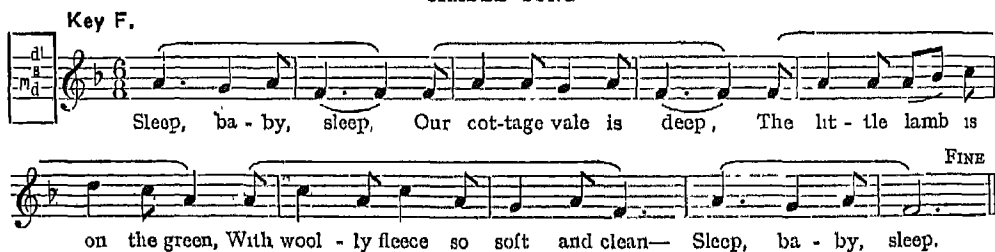
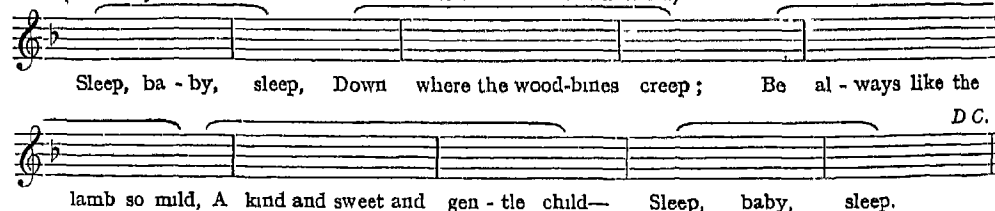
Before starting this lesson, the children should, if possible, all be made to sing the six notes of the hexachord, that is from *DOH* to *LAH* and back:

by name, and to move easily, not only through the scale from the keynote to any note and back instantly, but also from *SOH* and *ME* to any note and back instantly. It will also be of great value to make the children familiar with *LAH* and *SOH* lying below any given *DOH*, as well as above, thus giving the following possible scale·

Great care should be taken to exclude for a time *all* thoughts of *TE* and to explore the workings of the six-note scale as thoroughly as possible *

* With exceptionally gifted children it might be quite easy, if desired, even at this stage, to give them two six-note scales to play with, and in this way to introduce

called in old days the "natural hexachord" Such a double arrangement is all to the good, in the early stages, for the children who are able to grasp the two, and (thinking wholly in *one at a time*) run easily from one to the other. This starts the idea of modulation.

Notes for the scholar.—To-day we will ask the note *TE* to go out of the room for a little, and do all our thinking with the six notes that are left:

What friends and neighbours they sound! Try those that are *not* next-door neighbours but live three doors off, and listen how friendly even they are to each other:

Use them often for your rhythms.

SONG—THIS OLD MAN

SCHOLAR'S OWN TUNE

CRADLE SONG

XVII. ON RHYTHMIC PATTERNS FOR TUNES

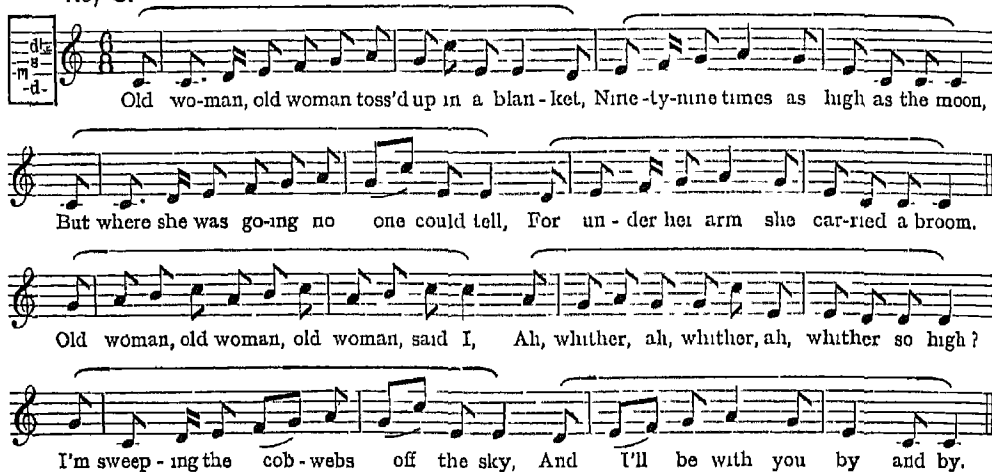
RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

Here the teacher can expand Lesson V, and point out to the children various ways of making tune patterns. It would seem well, for the whole of this year, to centre their minds upon what is there called the Rule of Four.

Of all the different ways in which tunes of four phrases can be planned, the form commonly called A A B A is undoubtedly the easiest and most comprehensive It has been well described by one primary school headmaster as the "sheet anchor" for all his tune-writing boys.

In the early stages a rhythmic line-pattern should be chosen, if possible by the child, for phrase A. In the A A B A scheme this rhythmic pattern is obviously the same for three out of four lines Even with beginners, the teacher will find it irksome to allow all four lines to fall in exactly the same rhythm It is, however, clearly unnecessary, for there will scarcely be a child who will not like to vary the rhythm in phrase B, coming back with all the greater freshness to the A rhythm at the end. Do not, however, let the rhythm be altogether different in phrase B in the early stages. It is good to have a tune with a short basic rhythmic figure such as:

running through the whole as its basis, but allowing many little varieties of application (see the Song of the Week—"Old Woman, old Woman") the rhythmic basis of which is:

An excellent plan is to increase the number of notes, at the end of the third phrase, making that moment the very busiest of the whole tune (see phrase 3 in the complete tune above).

It should ever be remembered that the A phrase is naturally never *exactly* the same each time it comes. Little varieties do not blur it. It can remain essentially the same to the ear of the mind, and yet have new turns to it

Notes for the scholar.—The first pattern to work upon is called A A B A. Learn it by heart. A means. *think a thought.* The second A means: *repeat it.* B means *think a new thought.* Then the last A means: *run home again to your first thought.* Try to write your own tune in this pattern to the old words "Sing a song of sixpence." You need not keep the A piece exactly the same all three times unless you like.

SONG—OLD WOMAN, OLD WOMAN TOSS'D UP IN A BLANKET

SCHOLAR'S OWN TUNE

XVIII. ON BALANCING AGAIN

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

The principle of balance in melody should be so deeply rooted both in our minds, and the children's, that we may soon begin to forget all about it, as we forget balancing in walking, running, swimming and bicycling, and obey its natural laws without even thinking of it. But the teacher may find it necessary to adopt some simple plans of fixing the habit. Few ways seem more immediately useful than the kind already suggested in Lesson VI. Let the children tap the rhythm of any first phrase with the left hand and the rhythm of the balancing phrase with the right in all tunes, and alternate left and right hand throughout all four-line tunes. In cases where there is a noticeable balance of half-phrases inside one and the same phrase, the whole phrase can still be tapped by the same hand, half of it with the thumb and the answering half with the little finger. When the tune has 6, 8, or 10 lines, the same plan makes balance clear (as in "Poor Tired Tim" in this lesson). But should there be an odd or extra fulfilling line, then it is easy to clinch this in the mind of the child by tapping each extra, odd, or fulfilling phrase with *both* hands together. It is interesting to note how many four-line tunes can be subdivided into six-line tunes with two such fulfilling lines in them. As an example:

> Little Bo-peep (tap with L H.)
> Has lost her sheep (R H.)
> And can't tell where to find them (both hands);
> Leave them alone (R.H)
> And they'll come home (L.H)
> And bring their tails behind them (both).

This is seen to be truly a balanced six-line scheme The child can grasp this scheme either by following the tapping as indicated in brackets, or by treating it as a four-line balance, with subdivision for L.H tapping of lines 1 and 2 and again subdivided L H tapping of lines 4 and 5.

When the habit of balance is safely established, the teacher should take opportunity to let the children see that it is easiest to balance by repetition, but interesting to balance a known phrase with a new one (AB), a new one with the familiar old one (BA) and also by developing (A balanced by A developed). These ways of balance run through the whole course of lessons

Notes for the Scholar.—Balancing and Matching seem like each other. Match your first phrase with your second. Match your third phrase with your fourth

"Poor Tired Tim" matches or balances "It's sad for him."

Tap the rhythm of one phrase with your left hand, then tap the next one with your right hand, and you will soon know which balances which

XIX. ON TUNES THAT GROW

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

The teacher may well liken the shapes of tunes to the shapes of flowers, plants or trees. By this means even the youngest children will recognise with pleasure that the phrases of their little tunes can be like petals of a flower—like each other, yet a little different each time. This likeness may be seen in the beginning of the tune "Bounce Ball," and care should be taken that the phrases which follow in their own tune shall match each other in the same gentle progression, as for example:

can be matched by or grow into:

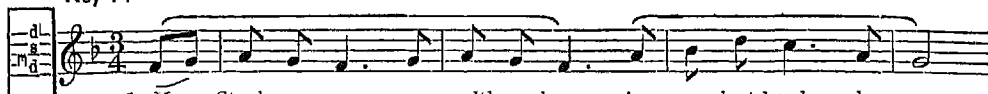
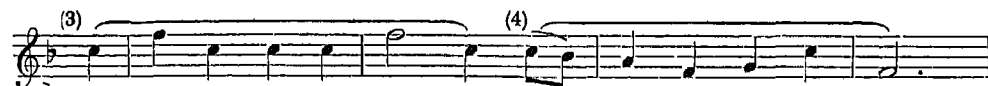
With the brighter children it will be possible to show how the song "King Stephen" grows out of the first five notes, and how the second phrase of "Four Loves" grows out of the first phrase

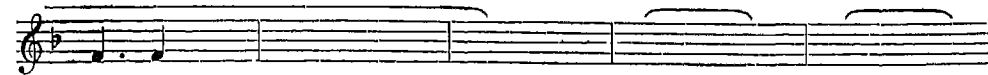
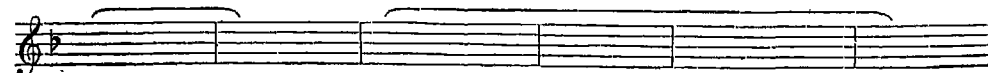
Following up this idea the teacher will find it helpful to lay down one of the rhythmic patterns, and let the children, in conversation and by humming, try to invent ways in which the rise and fall of successive phrases will grow to a point. (This can be connected later on with Lesson 39, "On the 'Spire' of a Tune").

Notes for the Scholar.—Have you ever picked up a few leaves of an oak tree? They all are very much alike, but none of them is exactly the same as its neighbour. They have grown alike, and yet grown a little different.

Think of the parts of tunes as if they were leaves or twigs of leaves on a tree, and see how they grow.

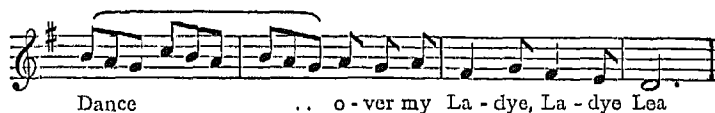
Take care, in writing your own tunes for this lesson, that all the phrases match well.

SONG—KING STEPHEN

SONG—FOUR LOVES

SCHOLAR'S OWN TUNE

Wilfrid Thorley

XX. ON PHRASES THAT TALK

RHYTHMS AND PHRASES FOR THE LESSON

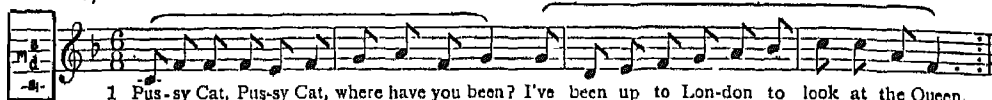
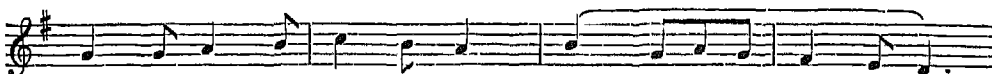
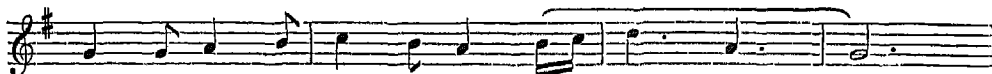
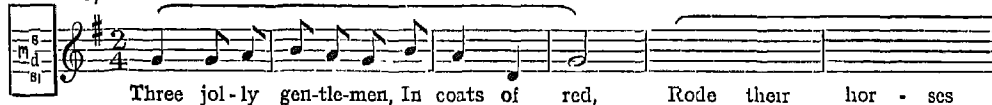
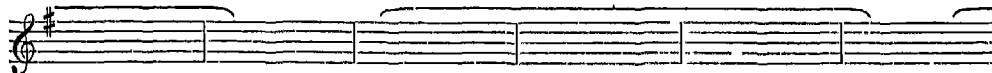
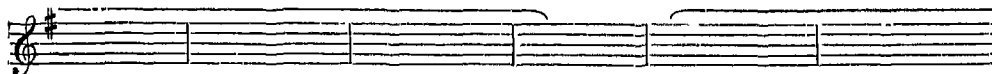
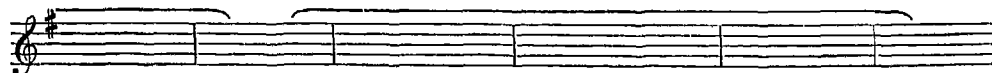
TEACHING NOTES

The need of this lesson will be that of making clear to the children the absolute oneness which is often possible between the rhythm of the lines of a poem spoken with spirit, and the rhythm of a tune to match This does not mean that it is possible to make musical rhythms and speech rhythms either completely alike or completely dependent upon each other. For instance, at the words "Dance over my Ladye Lea" in "London Bridge is broken down," it would be quite becoming if a dashing musical rhythm were introduced, say, on the word "Dance" in any new setting of that refrain; thus.

But when the words of the poem set are in themselves carrying interest or even information as they are uttered, the children should be made aware of, and interested from the first in making the rhythm behind the words and the tunes *natural to both*,—in fact one and the same rhythm should generally serve.

To get this lesson home let the children say together the words of "Three jolly gentlemen" over and over again on a single note. Let them say them carefully, then descriptively, then dashingly, then whisperingly, and so forth. By this means the poem will sparkle with life and rhythm. Then let them begin to make up their small tunes to the same words, in the very same rhythms. Phrase 2 above may make a good start.

Notes for the scholar.—Say together the words of your tune for this lesson over and over again. Dwell a little on all the words you like, and put a lot of meaning into them.

After you have done this a few times perhaps your own tune to it will begin to grow naturally.

SONG—PUSSY CAT, PUSSY CAT
Key F.
1 Pus-sy Cat, Pus-sy Cat, where have you been? I've been up to Lon-don to look at the Queen.
2. Pus-sy Cat, Pus-sy Cat, what did you there? I fright-ened a lit-tle mouse un-der the chair.
SONG—LONDON BRIDGE IS BROKEN DOWN
Key G.
Lon-don Bridge is bro-ken down, Dance o-ver my La-dye Lea,
Lon-don Bridge is bro-ken down, With a gay La-dye
Build it up with iron and steel,
Iron and steel will bend and bow,
Build it up with wood and clay,
Wood and clay will wash a-way,
Build it up with silver and gold,
Silver and gold will be stolen away,
Build it up with stone so strong,
Now it will last for ages long,
Dance o-ver my La-dye Lea,
(Repeat words above.)
With a gay La-dye.
SCHOLAR'S OWN TUNE
Walter de la Mare
Key G.
Three jol-ly gen-tle-men, In coats of red, Rode their hor-ses
Up to bed. Three jol-ly gen-tle-men Snored till morn, Their
hor-ses champ-ing The gol-den corn. Three jol-ly gen-tle-men, At
break of day, Came clit-ter clat-ter down the stairs And gal-loped a-way.

XXI. ON FAIRY WORDS TO FAIRY TUNES

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

This lesson is planned to give teachers special opportunity to release the melodic imagination of the child in unconventional ways The six solfa syllables of which the children are gradually gaining the mastery will be useful in order to keep them anchored as it were to the most familiar intervals, and to well-rounded phrases Let them work in groups of four from *DOH* to *FAH*, *RAY* to *SOH*, *ME* to *LAH* and *SOH* to *DOH* upwards and downwards; also curling both up and down in the same phrases (See No 6 above).

When the actual shape of the melodic phrases is thus secure in their minds they should be encouraged to use them in a free, fairylike, sprightly, and even surprising way The very thought of fairies must of course be accompanied with soft singing, very lively and rhythmic (*dancey* is a useful word here).

Words should be fitted to the rhythms and phrases given above. Thus "Crowds of them and crowds of them" would go well to phrase I.

After a time stimulate the children to invent their own more "dancey" phrases for exactly the same words.

Notes for the scholar.—Of course you must think fairy-tunes and fairy-ways of singing for all words about fairies, and of course you must sing them very softly and as quickly as ever they will go, as the fairies would

Use the notes from *DOH* to *FAH*, and, when the fairies cannot dance in *them*, try the notes from *ME* to *LAH* or *RAY* to *SOH*, and if the fairies dance out of them, let them dance into the four notes from *SOH* up to top *DOH*. You will find, if you work in this way, you will soon make real dancey fairy-tunes.

SONG—FERRY ME ACROSS THE WATER

Christina Rossetti

SCHOLAR'S OWN TUNE

Rose Fyleman

XXII. ON SINGING WORDS CLEARLY

RHYTHMS AND PHRASES FOR THE LESSON

Walter de la Mare

TEACHING NOTES

This lesson should be practised very softly.

(1) Explain to the children that their mouth is the "word-machine" Let them touch their throat:—"There is their musical instrument." Let them touch their chest:—"There are the bellows." But the mouth is going to shape all the words so beautifully that not one which they sing will be missed. (2) Let them practise pure vowels in the following two ways, for a minute now and then, on various notes very softly thus:

(3) For consonants give them two special rules: (1) *Prepare* every consonant; (2) Sing every consonant exactly *with* the team. *Preparation* of the lips, tongue, throat, etc, and unanimity are the two qualities which spell success in this matter. Set the children who have exceptionally clear diction (some children acquire it easily and early in life) to stand opposite the rest of the children, then let them watch each other's lips, and listen, and vie with each other as to who will prepare each consonant (each *b* and *p* and *d* and *t* and hard *g* and *m* and *l*, etc. etc.) most thoroughly, and as to who can best keep with the others. The "game of consonants" will be invaluable in this. Do not let them do more than two or three letter-verses at a time.

Notes for the scholar.—1. Words in singing must be as clear as in the clearest speaking. 2. Prepare your consonants 3. Fire them off together every time. 4 Practise singing words very softly.

SONG—A GAME OF CONSONANTS†

OTHER USEFUL LETTERS:

Ray,	Re,	Rye,	Roe,	Rue
Say,	See,	Sigh,	Soe,	Sue.
Tay,	Tea,	Tie,	Toe,	Too.
Vay,	Vee,	Vie,	Voe,	Voo.
Way,	Wee,	Wye,	Woe,	Woo.
Zay,	Zee,	Zye,	Zoe,	Zoo.
Jay,	Jee,	Jye,	Joe,	Jew.

In advanced lessons DOUBLE CONSONANTS, like Br, Pl, Tr, Fl, Tr, etc., can with advantage be tried.

Walter de la Mare

SCHOLAR'S OWN TUNE

†Derived from Dr Rimbault's collection

*This last word should in all verses be pronounced with the very short *e* sound: "bĕr-byè, dĕr-dyè," etc., as a stammerer might do it.

XXIII. ON READING TUNES ON THE STAVE AND PICKING THEM OUT ON THE KEYBOARD

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

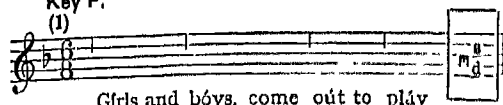
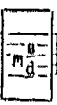
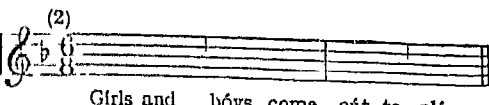
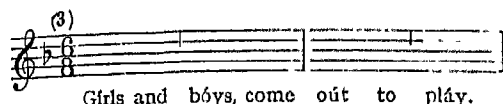
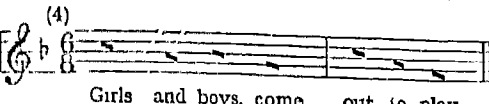
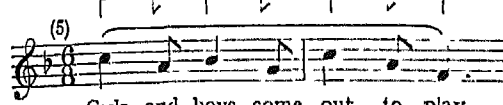
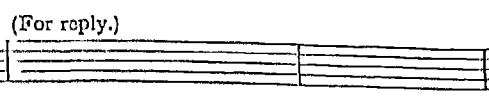
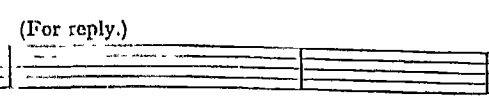
Continuing Lesson Twelve, it is important to link up the act of reading a melody with the act of picking out the notes of the same on a keyboard, and both these actions must be linked with the thought and the sound of the tune. At this stage only the very simplest start in this linking process can be attempted, and of course the successful start is again likely to be the rhythmic start on a single note. All in the class can pick out the single notes upon which the rhythm is sounded, on their diagram or dumb model keyboard (see Phrases 1, 3 and 5 above). The next stage will be to show them how to place their hands for phrases 6 and 7 where the actual notes of the tune are to be picked out. For an upward moving phrase (7) they do well to start with the thumb of the right hand. For a downward moving phrase (6) they should start with the little, third or middle finger Then they have a chance to play the whole phrase smoothly without moving the hand away from its first position. But fingering should not be pressed upon them. The first aim is that of linking up sight and sound permanently with the thought of the tune and with each other. Point to any note on the keyboard and ask a child to sing it. Then sound it and let the child correct its error by sound A second step is to point to a note on the stave and ask the children to pick it out on their keyboard, then let it be sounded and sung. Some will be very much

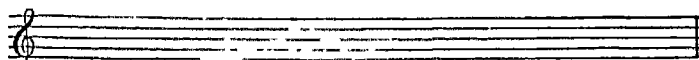
slower at this than others, but all in time will come to associate the *sound* of "Dashing away with the smoothing iron" with the *sight* of it (*a*) written on the stave and (*b*) picked out on the keyboard.

Notes for the scholar.—1. Pick out Phrases Nos. 1 to 7 one by one at the keyboard. 2 Sing each one after you have picked it out. 3. Play and sing them at once. 4. Try at last to look at the phrases while you play them and not at the keyboard.

SONG—DASHING AWAY WITH THE SMOOTHING IRON*

Flora Sandstrom

SCHOLAR'S OWN TUNE

* Collected and arranged by Cecil J. Sharp. Copyright, 1909, Messrs. Novello, Ltd. By permission of Miss Karpeles.

XXIV. ON WRITING OUT TUNES ON THE STAVE

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

A soiled scrap of exercise paper was given in at a military station during the war, with figures scrawled in pencil in long line across it—what could it be? A young officer had made up a tune of his own, while fighting, and this was the only way he could invent in which to write it down for us to sing when he came out of the line. He gave each note of the scale a number, and it was fairly easy to read the tune from his numbers He did not show the rhythm, or anything but the up-and-down of the notes. Rhythm had to be all guess-work.

But everyone who can think, or tap out a rhythm, or sing a simple tune, should surely be able to write them down clearly and completely on the stave of five lines. It should not be as hard as it seems.

The following line of action is suggested for class practice in this important yet secondary matter.—

(1) Choose for easy writing practice a simple tune that all know well (e.g. *John Peel*, or *Girls and Boys, come out to play*), at first avoiding tunes that modulate.

(2) Let each scholar prepare a stave for each line of the tune to be written, and let the same be prepared on the blackboard before the eyes of the class, writing the words of each line under the blank stave, thus:

(3) Agree upon the keynote and insert the baby modulator at the beginning of the stave:

and, if the class seems to need it, the degrees of the scale can be written down for reference as well:

To these add the resultant *key signature:*

without further comment (at this stage) than that these "flats" bring enough black notes into the stave to make the order of our scale exactly right for this keynote *

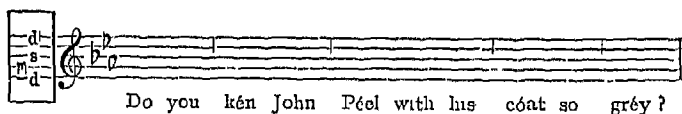
(4) Now to the business of getting all complete on paper. The three great matters are:—

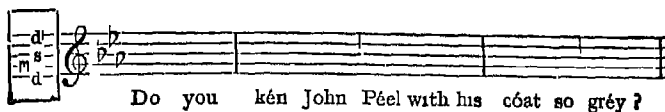
(*a*) the strong and weak;
(*b*) the long and short;
(*c*) the high and low.

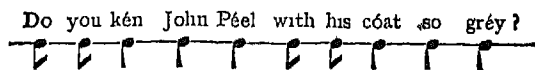
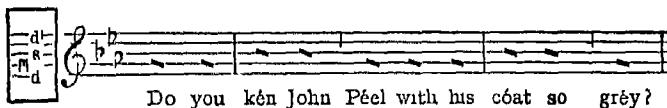
The scholars should choose which of the three they want to pencil in first. From this point pencils should be used, and the class should continually be encouraged to sing or hum the details of the line as they are thinking out and getting them down on to paper.

For (*a*) first tap out with pencils on desk, while singing, all strong syllables, and put a pencil tick over each of them—*singing the tune the while*.—

tap tap tap tap
Do you kén John Péel with his cóat so gréy?

A bar-let ǀ can then be filled in on the stave before each of these strong syllables.

* It is possible, if a teacher sees advantage, merely to write the words "Key E flat" instead of the signature of three flats, leaving the whole question of flats and sharps upon the stave in abeyance for the moment. This is not recommended

From these it is easy to see the chiefest accents of all and draw *complete* bar-lines at each of these chief accents:

For (*b*) the children must agree upon three main values of notes, calling them by the familiar terms *long*, *short*, and *hold*, and choosing in this case, and as often as possible, the same kind of note for the same relative value. i.e. ♩ for long, ♪ for short, and 𝅗𝅥 (or ♩.) for hold respectively.*

When the three correct values are fixed, let the rhythms be tapped out and the note-values pencilled lightly *under the words*:

For (*c*) Sir Arthur Somervell's admirable plan should be adopted by all, because, with little strokes of the pencil, the rise and fall can be drawn on the stave *very nearly as quickly as it can be sung*:

To sum up the process, it is in these three separate pencilled ways:

(*a*) by marking accents and bar-drawing,
(*b*) by writing out the rhythms of each phrase,
(*c*) by ticking out the rise and fall

that the whole process of writing out any melody while thinking it (and tapping it out, and humming it), can be quietly and surely acquired. Care should be taken to practise writing only well-known tunes and scholars' own efforts until they are accustomed to the process.

* It is a great advantage, in the early stages, to fix in a scholar's mind (by much use, and by writing out) these two basic rhythmic units of common time and six-eight time—namely *long, short short, hold* (♩ ♪ ♪ | 𝅗𝅥) and *long, short, hold* (♩ ♪ | ♩.)

Notes for the scholar.—Learn to write out a tune, bit by bit, in this way:

1. Write the *words* under an empty stave.
2. Mark their chief accents and draw their bar-lines.
3. Write all the *longs*, *shorts* and *holds* under their right words.
4. Tick the notes of the tune into their right places on the stave over each syllable.

Then at last you will be ready to write out the tune itself, all complete, on the stave, just like print.

THIRD YEAR'S COURSE

OF

MUSIC

XXV. ON KEYNOTE AS STARTING POINT AND GOAL

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

The aim of this lesson is to teach what may be called the centring of tunes. The mind should have such firm hold upon the keynote of any tune that it shall be free to wander at will into every related corner of the key. When once the feeling of the keynote is clearly established (and that fairly early in the tune) either by prominence given to the note itself or to the key-chord, it is really well to keep the ruling note in the background. Let the children try to set the words of this lesson in such a way that the keynote shall sound fresh when Part I. of the tune is resumed (*Da Capo*). The gist of the whole lesson is contained in the simile given in the Scholar's Notes below.

Notes for the scholar.—You must often have seen a picture or a figure, of which the eyes are looking full at you as you stand opposite the picture. Then, wherever you move, the eyes seem to follow you. In every corner of the room they are looking at you.

You must think of a keynote as you think of those eyes. Wherever you are in the tune, you are still within reach of that keynote. It is always at the back of your tune, and perhaps at the back of your mind.

Learn to start with the thought of the keynote, to finish with it, and to have it in mind as you travel through the tune. Some tunes touch the keynote often as they travel, but this is not necessary. Indeed, it is very nice to move to all other points you can think of during the tune, because it is all the lovelier when you get home to your keynote.

SONG—CRADLE SONG

SONG—A SARDINIAN LULLABY

(newly set)

SCHOLAR'S OWN TUNE

XXVI. ON MAKING AND SHAPING PHRASES (I) ON CHORD-THOUGHTS

RHYTHMS AND PHRASES FOR THE LESSON

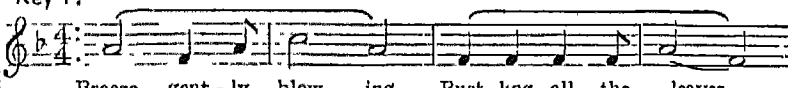
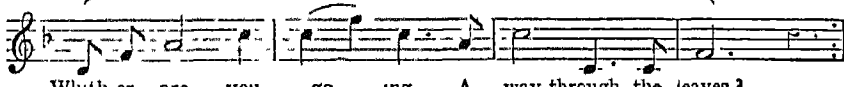
TEACHING NOTES

This and the two following lessons should be carefully linked up. There is danger that learners, much helped by the **d m s d'** chord, will set it up so fixedly in their minds that it will become quite difficult for them to think and sing **d f** at will This lesson is planned expressly to set up the chord-thought, and the phrases and songs given all favour this But the teacher should at the same time encourage the children to make and shape little phrases of their own round and about *one leap of the chord, especially the* **s d'** *leap* and its natural companion the **d f** *leap*, thus:

The children will also enjoy the same game round the major third, thus:

On no account should the children be kept to [s m d] as their only chord. Let them enjoy the fah chord [d' l f] and the soh chord [r t s] and let them get into the way of thinking of these three major chords by their names. Let them be often spoken about as well as sung. "Children, shall we find *fah-lah-doh?*" f f f f f l d' "And now, who will find *soh?*" "Now let's all find *soh-te-ray,*" etc. This obviates from the first the dull danger of setting up [d' s m d] as a sort of fixed mental image, immovable, and ultimately deadening in its effect upon melodising.

Notes for the Scholar.—Make great friends with the keynote and the key-chord. Remember them by name. **Doh** and **Doh-me-soh.** Think of each leap in this wonderful chord separately: thus.

d to m m to s s to d'

then get ready to make little gliding phrases round them.

SONG—BREEZE GENTLY BLOWING

Words from Walsworth School, Hitchin

SCHOLAR'S OWN TUNE

A BUGLE MARCH

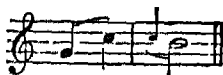
XXVII. ON MAKING AND SHAPING PHRASES (II) WITH PASSING NOTES AND GRACE NOTES

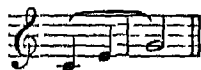
RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

Passing-notes and Grace-notes are very easily learnt, and seem the very making of a melody when a good firm conception of a chord (or a leap which is part of a chord), is already

at the back of the mind. Show the children that **Passing-notes** are notes that carry us smoothly from note to note of a chord, and get them to mark their passing-notes with a star, thus:

A **Grace-note** is any note added to another note as ornament, whether above it or below it. In old days they were *little* notes added to *big* notes (and usually above not below the big note):

This would be written nowadays:

It would be well to interest the children in taking any very plain phrase:

and gracing each note of it from the note above it:

giving the grace-notes half the value of the notes, to which they are attached. When a chordy melody is sounding dull, propose to the children· "Shall we try a nice little grace-note somewhere?" Or " What about a few passing-notes to make this run smoothly?" The addition of both kinds is very simple, and can be great fun. Favour the result that sounds best, and let all the class vote in the matter.

Notes for the scholar.—

Here is a plain chord tune:

Here it is with passing-notes added:

Here it is with grace-notes added:

You can always use for your own tunes whichever kind suits the words the best.

SONGS—1. SPEAK ROUGHLY

From *Alice In Wonderland.*

(Unaided work of a school child, age eight.)

2. NORTH COUNTRY RHYME

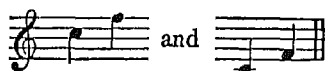
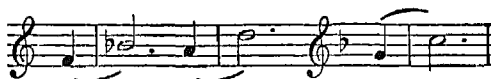
SCHOLAR'S OWN TUNE

R. L. Stevenson

XXVIII. ON LEAPING AND STEPPING

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

Of course the good working leaps are those to be found between the various notes of a common chord, but chiefly the leaps of octave (d to d') fifth (d up to s) and fourth (s up to d') Most important of all is the fourth, and it should be freely cultivated not only from s to d'

but from d to f, m to l and r to s.

It is so easy and beautiful and altogether good for vocal and melodious purposes, that its use by children should be more cultivated perhaps than that of any other interval It is good to encourage the tune-writers to pass back within their leaps thus·

This is by no means necessary, but it is useful and nearly always graceful. A golden working rule for melody seems to be "after stepping take a leap", e g.:

"and after leaping step":

SONG—WHIM WHAM WADDLE-HO

SCHOLAR'S OWN TUNE

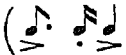
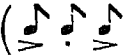
XXIX. ON WORK-A-DAY AND FA-LA-LA TUNES

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

As may be imagined, one of the most vivid and easiest ways of making songs real to children and of securing rhythmic zeal and efficiency is to link up refrains and whole songs with work-a-day actions. Children readily think of songs in connection with work or movement. Refrains can be invented for any action which allows of singing—such as marching (slow and quick), leaping or running, and various dance-steps or figures, as well as the actions of rowing, of planing, hammering, and sawing in the workshop, and of sewing in the needlework class. And regularly recurrent movement can be translated into simple tune- or refrain-form. Point out how Russian labourers on the Volga haul timber to the famous phrase:

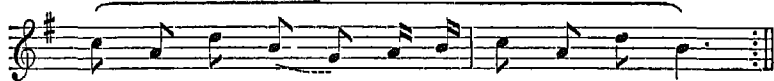
Give the children a fragment of the old Canadian Boat-Song to suit to the imagined action of rowing:

and get them to follow up the song of the week with skipping tunes in the same rhythm. Words are not needed, though a couplet is often a great help (see Section 6, "On Musical Form (*a*) First Phrases"). All tunes built for merry movement can be sung to *Fa-la-la*

* Children should learn to sing *into* and *through* the double zz sound.

and grouped together as the *Fa-la-la* tunes of the school. Start the children with a dancey phrase such as.

Fa, la, la, Fa, la, la, Fa, la, la, la, la, la, la

and they will readily continue this into a four-phrase tune to which they can then proceed to skip round the playground.

Notes for the scholar.—To make Work-a-day or Fa-la-la tunes, imagine someone at work. Think of sailors, for example, hauling ropes In your song this week, it is a Scissors-man, sitting up at his old-fashioned wheel in the street outside Then try to make up some words that fit his work—Buzz-a-wuzz! ( ) or Ticker Tacker ( ). Then try to make up his bit of work-tune. You can make any number of *Fa-la-la* tunes without words to dance to, or for leaping along, or running, or skipping.

*This version is derived from Dr Rimbault's book of Nursery Rhymes It is so arranged as to be useful for the well-known singing game

SCHOLAR'S OWN TUNE

XXX. ON SIMPLE AND COMPOUND TIMES

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

Teach two in a bar as the simplest simple time. It may be two crotchets ($\frac{2}{4}$) or two minims ($\frac{2}{2}$) or two anything. Then teach three in a bar as the next simplest time, $\frac{3}{8}$, $\frac{3}{4}$, $\frac{3}{2}$, but of course nearly always $\frac{3}{4}$. Four in a bar (especially for crotchets, $\frac{4}{4}$, or common time)

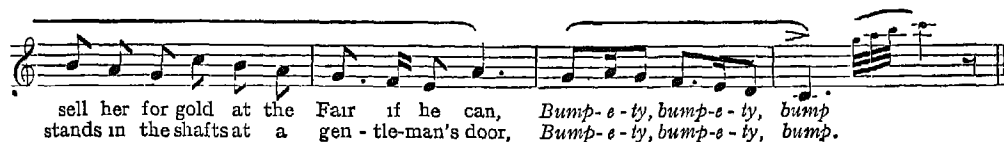
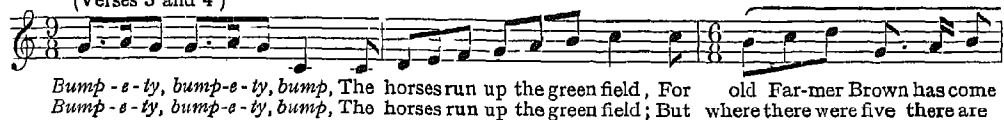
is also called simple; and $\frac{5}{4}$ and $\frac{7}{4}$ are simple but they get less and less simple; two in a bar and three in a bar should be taught as typical simple time. Then comes the question: what is compound time? Compound time is when two times are going together, a time within a time, when every BEAT of the *large* time makes a BAR of the *small* time. In all the compound times that are in common use, the small time is always three-in-a-bar—in this case three-in-a-beat of the large time. So every beat of the large time is always a dotted-note, and therefore divisible into three. The commonest and most useful compound time is $\frac{6}{8}$. A good way to teach it to children is to let two of the class stand out and count time

together: thus $\left\{\begin{matrix} 1\ 2\ 3\ 1\ 2\ 3\ 1\ 2\ 3\ 1\ 2\ 3 \\ \mathbf{1}\quad\ \ \mathbf{2}\quad\ \ \mathbf{1}\quad\ \ \mathbf{2} \end{matrix}\right\}$ many times over, both tapping their own

beats as they count them aloud by numbers. When this has been successfully done (let the counter of the big time think of a grandfather-clock, and the counter of the little time be busy saying "*one two three*" for every single tick of the big clock) Then the class as a whole can learn to count the two together as follows: **1** 2 3 **2** 2 3 | **1** 2 3 **2** 2 3 | **1** 2 3 **2** 2 3 | etc. etc. For completeness three compound times are given in the Rhythms and Phrases above, and two of them are to be found in the Song of the Lesson.

Notes for the scholar.—TWO in a bar is simple time. THREE in a bar is simple time. TWO multiplied by THREE is SIX. And SIX in a bar is compound time *when it is twice three*, because each of its two big beats is worth a bar of three little beats.

SONG—FAN THE FILLY

Wilfrid Thorley

SCHOLAR'S OWN TUNE

Edward Lear

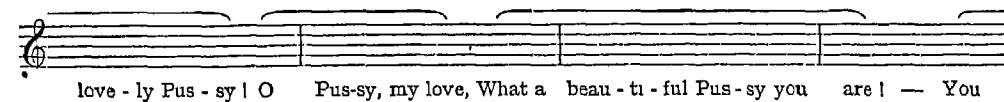
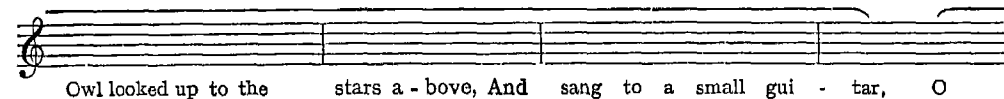
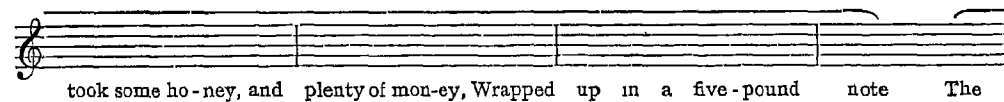
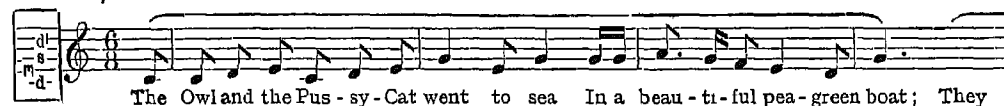
Key C

The Owl and the Pus - sy - Cat went to sea In a beau - ti - ful pea - green boat; They

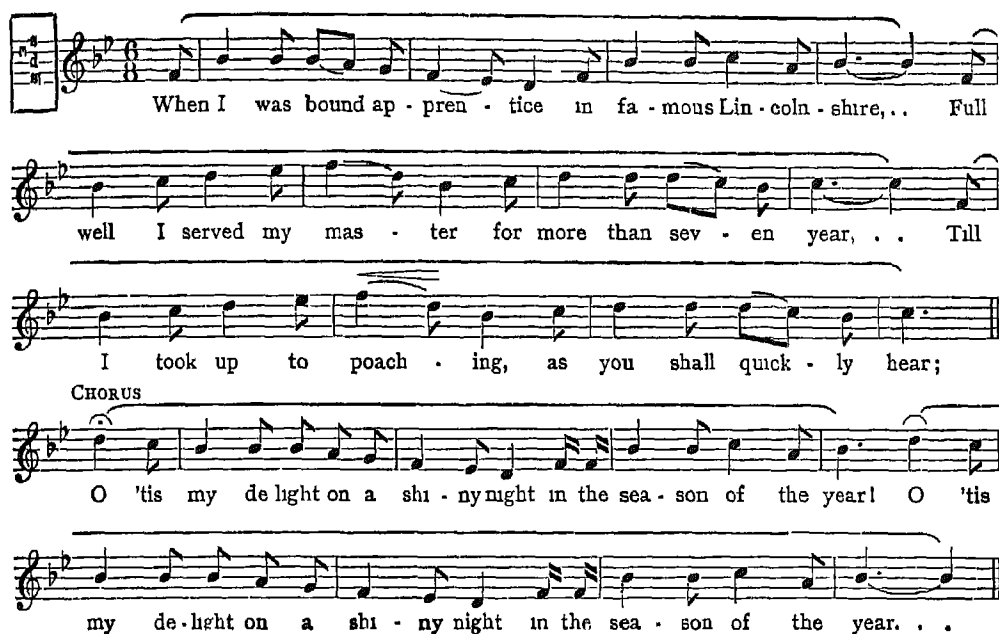
took some ho - ney, and plenty of mon-ey, Wrapped up in a five - pound note The

Owl looked up to the stars a - bove, And sang to a small gui - tar, O

love - ly Pus - sy ! O Pus-sy, my love, What a beau - ti - ful Pus - sy you are ! — You

are ! You are ! What a beau - ti - ful Pus - sy you are !

*These words are used by permission of the owners of the copyright, Messrs Warne and Co., Ltd.

XXXI. ON ANOTHER TUNE PATTERN. (ABBA)

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

In this lesson the aim is to give the children a good notion of the well-known variant tune-pattern called ABBA "The Lincolnshire Poacher" is a perfect example of it In the Rhythms and Phrases above, effort is made to give for comparison phrases which show in miniature the AABA scheme of balance contrast and return (see 1 and 3) and others which show the ABBA scheme (Nos 2 and 4) which no less effect a perfect balance and a contrast and a return to the first thought (A). Let the children for a few weeks make up very short fa-la-la tunes of their own in this pattern, taking care to end A with the keynote and to end B with *any note other than the keynote.*

Notes for the scholar.—When you are keeping the rule of four in your tunes you always must balance phrase one by phrase two, and phrase three by phrase four. But you can balance A (your first) by B (for your second) and then take B again (for your third) and have A saved up (for your fourth). So here is a new tune-pattern to use that keeps the rules. ABBA.

SONG—THE POACHER

SCHOLAR'S OWN TUNE

A DANCE-TUNE

(without words)

XXXII. ON SECOND THOUGHTS

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

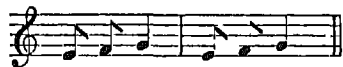
Ask the children whether they would like second thoughts to go one better than first thoughts. They must love their first thoughts, e.g

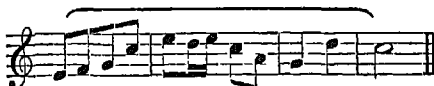
but get them to share the feeling of "Oh, how lovely this is, let's go on to one lovelier still!" e.g.:

In this way, interest and progress go together, and the quiet reply follows naturally:

and is fulfilled or rounded:

A good and natural course for a tune is well described in some such way as the following: "Think any lovely first thought, then pass on to a lovelier second thought, then balance up your accounts "

The "second thought" may be the second half of A or may be the whole of B. Tunes are often rather like wheels within wheels, and there is a most searching obedience to the law of balance required down to the last detail. But the *unit* of a child's thought is the thing to be watched Little children have naturally little *units*:

As they grow they want to stretch their melodic wings, and this

or even this

may result. But however short or long the thought may be, balancing must become second nature

Notes for the scholar.—If you have a lovely first thought for a tune, try to move from it to a still lovelier second thought; then you can balance up what you have, and bring the tune to rest all the more easily.

SONG—CRADLE SONG

Trans. A. L. Salmon | J. Brahms

1. E-ven-song and good-night, Shut your lit-tle eyes tight; Snug-gle soft-ly and deep, In the wrap-pings of sleep. When the morn-ing shall break May God kiss you a-wake, When the morn-ing shall break, May God kiss . . . you a-wake.

2. Shadows fall-ing, good-night! The an-gels of light Shall show you in dream Christ's tree all a-gleam. Be your slum-ber-ings deep, See-ing heav'n in your sleep, Be your slum-ber-ings deep, See-ing heav'n . in your sleep.

SCHOLAR'S OWN TUNE

Walter de la Mare

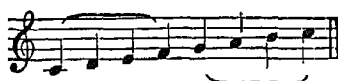
XXXIII. ON THE USE OF HALF-SCALES

RHYTHMS AND PHRASES FOR THE LESSON

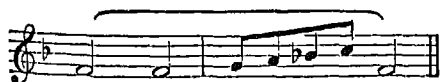
TEACHING NOTES

Nothing seems more useful for giving children a grip, not only of the whole scale itself but of the idea of modulating from scale to scale, than working deliberately with them in half-scales, as e.g..

Half-scales should all lie within the perfect fourth. When the children have seen how easy and pleasant it is to sing whole phrases within one half-scale (even whole tunes can lie within them) they should learn to move from one half-scale to another. The ways of doing this are clearly indicated in the Rhythms and Phrases above and exemplified in the Scholar's Tune below. But it should be noted and made clear to the children that half-scales may touch, thus:

or they may be separated by one step:

or they may overlap:

and in all these three ways they may be used together for tunes The order of tones and semitones in half-scales will vary, according to the degree of the scale upon which they begin They are all good for use except the one from *fa* to *te*, which is apt to be harsh and difficult.

Notes for the scholar.—Try to write a whole tune with half a scale (*doh* to *fa*). Then try to write one using *doh* and half a scale beginning on *ray*.

Then write your A phrase in one half-scale and your B phrase in another.

SONG—HERE'S A HEALTH UNTO HIS MAJESTY

d' s m d s,

(SOLO.) Here's a health un - to his Maj - es - ty, (CHORUS) With a fa la la la la la la.

(SOLO.) Con - fu - sion to his en - e - mies, (CHORUS) With a fa la la la la la la!

(SOLO) And he that will not wish him health, He shall have nei - ther wit nor wealth, Nor yet a rope to hang him- self, (CHORUS) With a fa la la la la la la la la la, With a fa la la la la la la.

SONG—FLEMISH LULLABY

A. L. Salmon

SCHOLAR'S OWN TUNE

S. T. Coleridge

XXXIV. ON A NEW-OLD SCALE

RHYTHMS AND PHRASES FOR THE LESSON

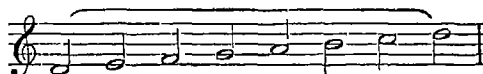
TEACHING NOTES

The so-called Dorian Scale has a minor third and a major sixth, and there seems good reason to think that new and beautiful use of this very old scale can be made by children (see Introduction) Show the children that if they take the lower half of the ordinary major scale.

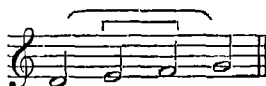
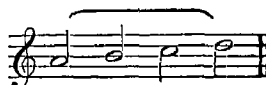
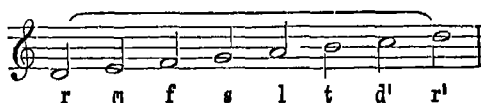
and then compare it with the upper half

they will find the semitone (as bracketed here) is the top step of the little ladder. Now if they take a half-scale with the semitone as the middle step:

and add another half-scale exactly like it, above it:

they will then have our New-Old scale, the Dorian

The secret of using, enjoying and understanding it seems to lie simply in the firm use of these two half-scales, and of the common chord of the scale, the Ray chord

Give the class a firm hold of D and A (the keynote of the mode and its fifth), through singing the Rhythms and Phrases, and the phrases from both songs below. Then let them complete their own Tune in the same scale and manner, always thinking of D and A (*ray* and *la*) as the chief anchors of their thoughts.

Notes for the scholar.—Take the half-scale that starts on **D**:

and then the half-scale that starts on A:

and put the two together·

and you will have an old old scale that you can use for new tunes.

SONG—THE SNOW

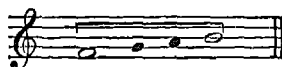
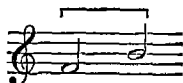
SCHOLAR'S OWN TUNE

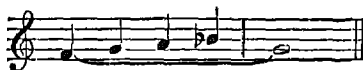
Thomas Dekker

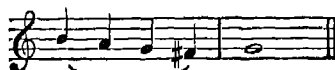
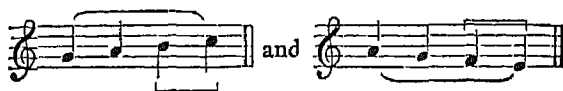
XXXV. ON FITTING HALF-SCALES TOGETHER

RHYTHMS AND PHRASES FOR THE LESSON

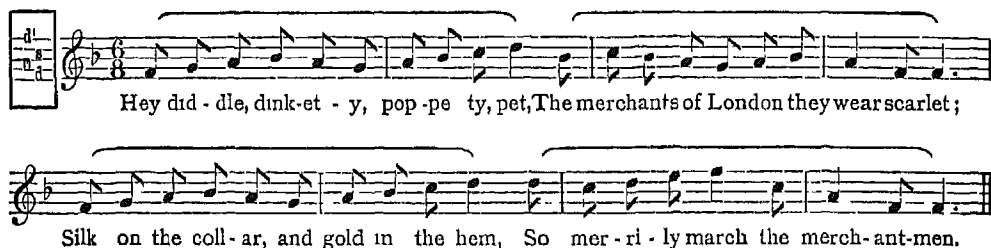
TEACHING NOTES

The leap of a so-called augmented fourth:

or Tritone (three steps of a tone in succession) was hated and banned by the old melodists. In harmonic music its use is constant. In melody it still proves often harsh and troublesome, though we have long ago ceased to call it *diabolus in musica* which was its old name, and in harmonic melody, such as Brahms' little "Lullaby" in Lesson Thirty-two, it can be beautifully used as an arpeggio. For all this, it seems wise to teach the children to write melody without it. Now the secret of fitting half-scales together is the secret of avoiding this false fourth:

A child's first use of a B flat (the note called *ta*) or an F sharp (called *fe*) may well be in order to make one half-scale fit its neighbour half-scale. Here are some working rules for the teacher's guidance (1) Any half-scale with F (fa) in it will fit any half-scale that has not got the upper B (or te) in it and will fit any half-scale with B flat in it (2) Any half-scale with B (te) in it will fit any half-scale that does not contain the F (fa) below it, and will fit any half-scale with F sharp (fe) in it Here are some well-fitting half-scales upon which melodies could be beautifully built·

and to these could be added if needed.

Here are some more which fit beautifully

and to these could be added if needed

(3) It is quite easy to use two half-scales *with* the offending notes F and B (three tones apart) in them, provided two of the tones are linked to a semitone in each case:

The ugly sound is thus quite avoided.

Notes for the scholar.—You have learnt that phrases move beautifully in half-scales. But whole tunes need to be able to move out of one half-scale into another half-scale You need to do this beautifully Remember in doing it never to go direct from F (*fa*) to B (*te*) and you will be fairly safe

SONG—THE MERCHANTS OF LONDON

Blake

SCHOLAR'S OWN TUNE

XXXVI. ON WRITING OUT TUNES

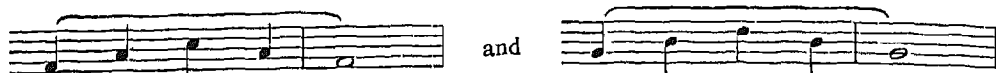
RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

The avowed aim of this lesson will be to interest the child in writing out its own tunes. Just as a little child must be able to understand and speak English long before it is called upon to be interested in reading and writing it, so with Melody The first thing is to hear and make up tunes Having heard and sung tunes in abundance, it is possible to interest children in reading melodies. Then having heard, sung and read them for a while, to conquer the process of writing them will become a real interest, especially to children who have made up their own small tunes They will want to write them and look at them.

Having been through the stages of putting accents, bar drawing, rhythm writing, ticking out rise and fall and then completing the writing out of well-known simple four-phrase tunes, as fully described in Lesson XXIV, the children will be keen to acquire the power to make complete copies of their own tunes. This can be done only when they have mastered the *look* of rhythmic patterns and of simple rise and fall on the stave, e g., they must know at a glance that the leap up of a fourth with steps down again *always* looks like this:

or that the leap down of an octave and a return by steps up looks like this:

and so with the look of chord passages·

In this familiarity *with the look of familiar sounds on the page* lies the secret of writing out tunes successfully. It goes together both with knowing the *sound* of a rhythm and a rise and fall, and knowing the *look* of them on the stave.

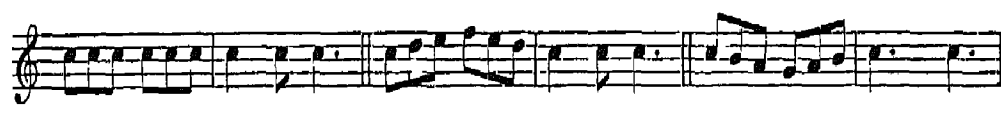
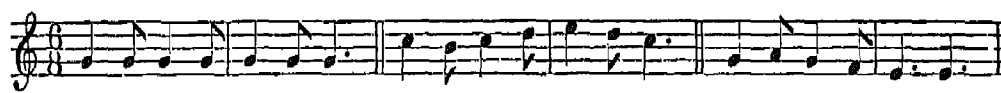
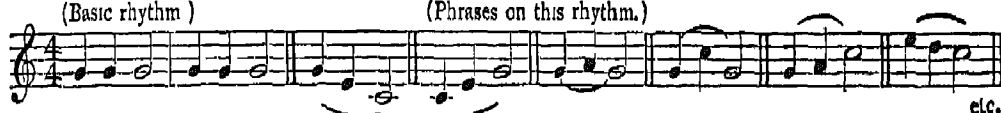
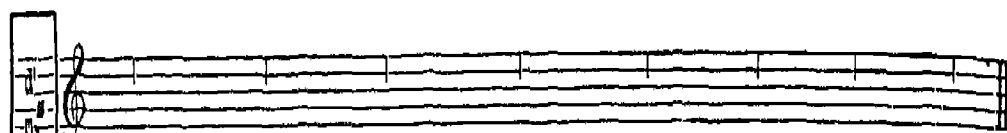
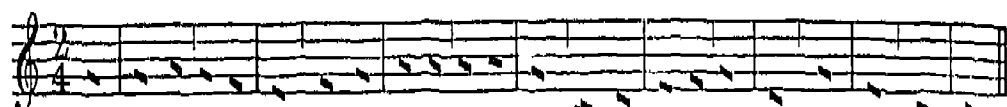
In this lesson then, the children should be given the task of writing out *their own rhythms* and *their own rise and fall* to whatever lines are set, line upon line, discussing them together, discussing the look of the phrases, and then copying them out afresh—at first four or five times each phrase—according to the rules given in Lesson XXIV.

SONG—THERE WAS A LITTLE MAN

SCHOLAR'S OWN TUNE

William Blake

ADDITIONAL NOTE

The following common Rhythms and Phrases are set down here in the hope they may be found useful in giving the children writing-out practice and in stimulating them to find and write out similar rhythms and phrases which they have heard or discovered for themselves.

The following specimen of the *stages* of copying out an 'own' tune (according to Lesson XXIV) may be useful.

As will be seen, there are three distinct stages on three distinct staves before the final (fourth) stave appears. one for *accents* and indicating bars, one for rhythmic *longs and shorts*, one for ticking out *rise and fall*. These three preliminary stages can all well be done in pencil, stage by stage, on one and the same stave *on to which can be inked the final result* Children will thus grow gradually independent of preliminaries.

FOURTH YEAR'S COURSE

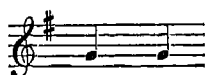
OF

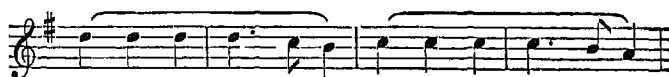
MUSIC

XXXVII. ON HOME-AGAIN PHRASES AND ENDINGS

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

There can hardly be a better or more comprehensive example of what are here called "home-again" phrases and endings than the ending of *God save the King*,* and the temporary or halfway ending in the third line of it The keynote is the reiterated starting-point:

followed by a curl round and a journey away from it Nothing could be more steadying than the first return to it from both above and below.

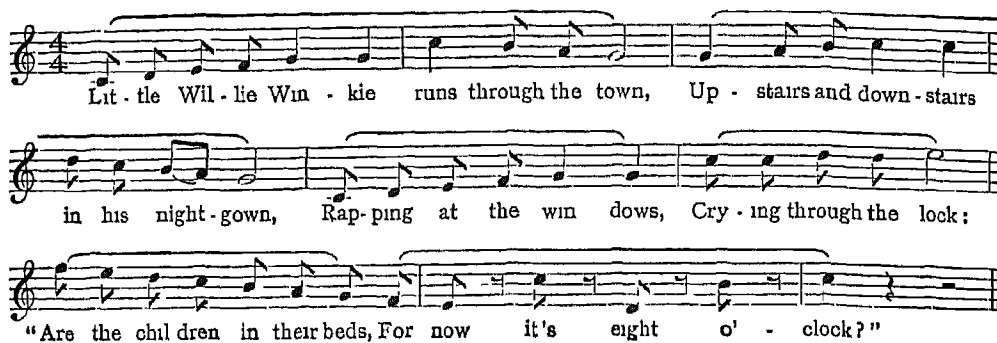
Then comes the second part of the tune with its new phrases:

* The National Anthem is a specially finely formed tune in every way. It is pleasant to remember Beethoven's reported praise of it:—"What a fine tune the English have!"

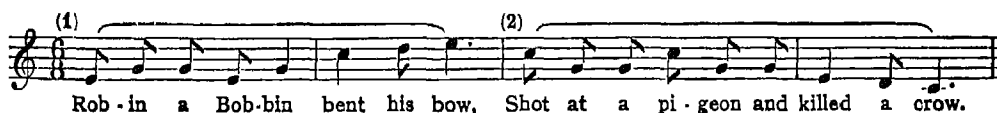
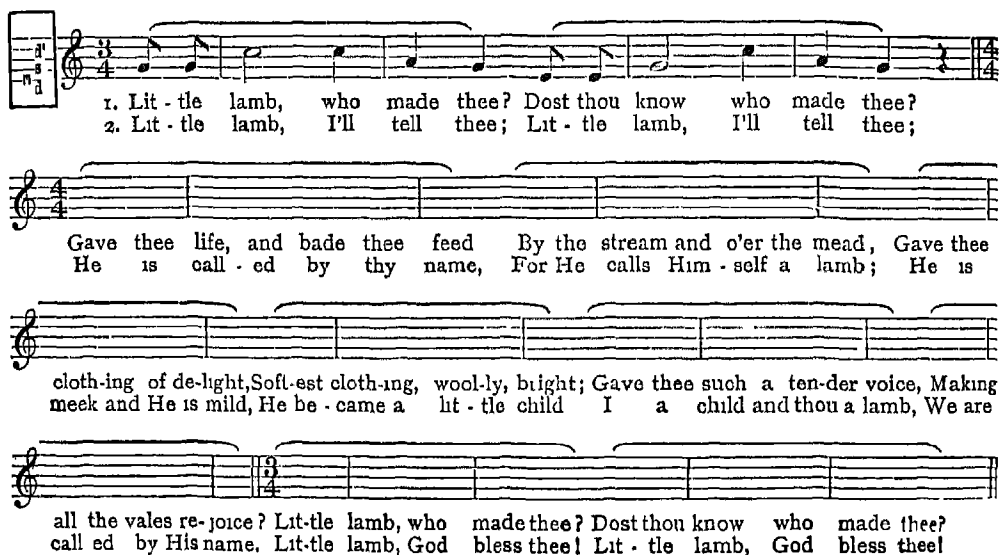
and their complementary curl upwards away from the keynote:

It is hard to imagine that any child will fail to feel how the tune needs a home-again touch, and how utterly natural and satisfying a rule is fulfilled by the phrase:

This lesson should centre upon the need for ending every tune naturally and satisfyingly. The three chief ways of doing this are. (1) to get home to the keynote or to the key-chord; (2) to bring the tune round at the end to the A phrase itself, as to a kind of pleasant recollection or echo, (3) to *fulfil* the tune by gathering up missing notes and binding or carrying them all to the home-note with a kind of comprehensive confident sweep Handel's well-known ending:

will give a convincing example of this. If such an ending is tried as a reply to phrases 5 and 6 above, it will be at once seen how easy it is to give a plain end to a tune. But children can soon find other more adventurous "routes" to the home-note.

Notes for the scholar.—Here is the plainest home-again phrase and ending to a tune that even Handel could find.

Everyone knows that this must be meant for a journey home and an ending. Always try to make your endings sound as satisfying, though they may want to be or often indeed *have* to be more roundabout.

SONG—ROBIN-A-BOBBIN

SONG—LITTLE WILLIE WINKIE

Barton Road Girls' School, Dover

SCHOLAR'S OWN TUNE

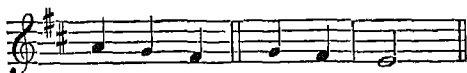
William Blake

XXXVIII. ON OTHER PATTERNS

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

In their fourth year, the children should be free to write tunes of many other patterns than the AABA or ABBA of previous lessons. Phrases 1 to 4 above together make a well-known hymn-tune in what can only be called an ABCD pattern. All four phrases start new curves No two are apparently alike, their likeness is hidden and inward. In the same way let the fourth-year classes invent varied tunes, from the extreme patterns AAAA (where the four phrases are virtually the same phrase repeated with perhaps slight variations) to ABCD where they are all different with inner and perhaps only subtle likenesses binding them into unity. ABAC is a good pattern (see Song for this lesson). ABCB is another. AAAB can be very interesting if A is nicely varied in some way as it proceeds, and if B has a good "home-again" ending about it (see previous lesson). In Tennyson's poem below, the children can well vary all their inner phrases provided they balance one another. All patterns must show Balance, Variety and Unity.

Notes for the scholar.—Though you may keep to the Rule of Four for a long time, you cannot use up all the different patterns for tunes You will still find AABA and ABBA two of the best possible patterns to work upon. But you can even have AAAA if you try to make the same thought a little more lovely and interesting each time You can also have ABCD, *all* different phrases! But then you must make the different phrases belong to one another Look at the four first phrases (1 to 4) above. All different, yet in each of them you hear the same pattern of drooping phrases

and so on. Try ABAC for a pattern. Then make up others of your own. Let them all balance and have good "home-again" endings.

SONG—GOOSEY GANDER

SONG—LITTLE NUT TREE

SCHOLAR'S OWN TUNE

XXXIX. ON THE "SPIRE" OF A TUNE

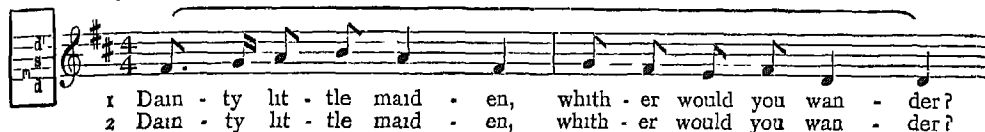
RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

Show the children how the "spire" of *God save the King* is kept for the last line, and the highest point in a tune is often kept for the B phrase or for the end of the whole tune, and how that when the spire of a tune occurs early in the tune it is harder to build up and keep up the interest of the journey. Show how tunes may, like a cathedral, have smaller spires in the A phrases, and then touch a highest point of all in the B phrase or towards the very end, like the Londonderry Air. Finally show that although tunes can often be very much improved by being given one outstanding high point or spire, it is quite as possible to have a beautiful tune without a spire as to have a beautiful building without one

Notes for the scholar.—A walk seems all the happier for an object, such as reaching some spot of rare beauty, or climbing a hill or a tower for the view it gives or for the pleasant aim it gives. And a tune also seems all the better for an aim. "Keep the best till last" is not a bad rule for tunes Build up gradually to some long phrase that you like more than others. One way of doing this is to build up gradually to the highest note that is natural and beautiful on your instrument or voice.

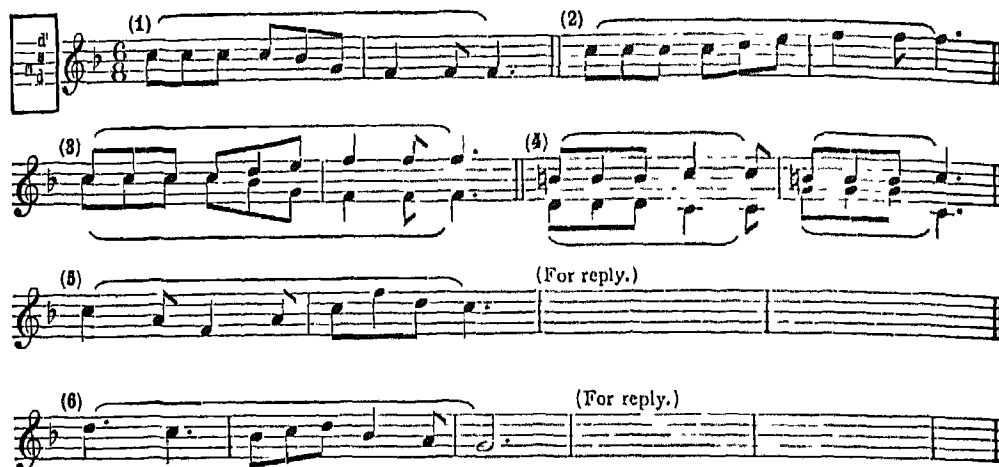
With a swing.

Saville

"With a fa la la, *etc*, to be sung three times, pauses last time only."

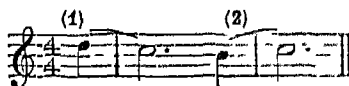
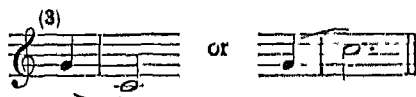
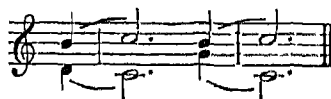
THE LONDONDERRY AIR

SCHOLAR'S OWN TUNES

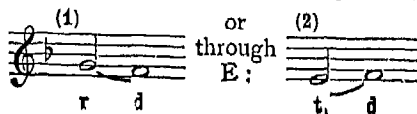
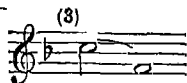
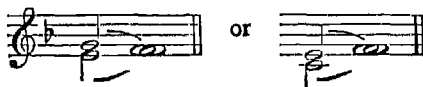
XL. ON TWO-PART CADENCES

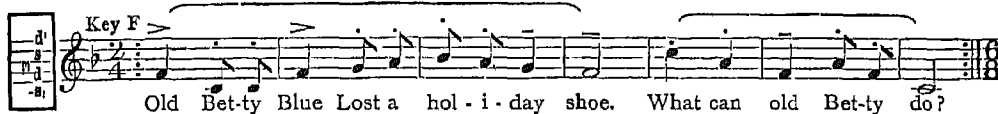
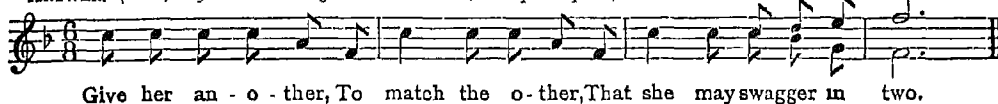
RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

Obviously the two melodious and graceful ways of getting home again to the home-note or keynote in any final or semi-final phrase are through the notes above and below it respectively:

(1) (2)

And a third clearly harmonic way of doing it is well-known to all:

Any two of these ways will combine to make a two-part cadence. But it is best that one of the two parts should always be No. 2:

A good way to teach the meaning of cadences in music is to be found in trying to invent special two-part endings to melodies, singing in unison *until the final phrase*. Then let the voices find two different paths to the final or keynote. In doing this keep Bach's rule (as given to his pupils) of writing the two parts in contrary movement so far as possible.

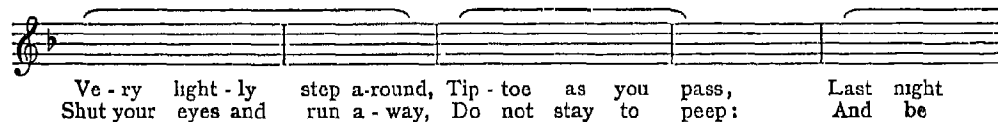
Notes for the scholar.—If F is your home-note or keynote you can pass home to it through G:

(1) r d or through E: (2) t, d

and you can leap to it from C thus

To make a cadence in two parts combine either the first or last of these with the second, thus:

SONG—OLD BETTY BLUE

QUESTION. *(Everybody in the class asks this question, one by one.)*

ANSWER. *(Everybody answers it together with a rush, at a quick speed.)*

SCHOLAR'S OWN TUNE

Anon

IF YOU SEE A FAIRY RING

fair - ies fro - licked there, And they're sleep - ing some - where near.
sure you *nev - er* tell, Or you'll break a fair - y spell.

XLI. ON THREE WAYS OF BALANCING

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

Remind the children that at a very early Lesson (No VI) we found that the easiest way of all to balance a phrase is just to repeat it This principle of echoing a phrase, and so balancing it, goes on through all music.

To illustrate this let the child take a scrap of paper; fold it, take a pair of scissors and cut against the folded edge any shape of scissor-cut that he or she likes Then open out the bit of paper to see the balanced pattern obtained In this way may be seen the picture of a musical phrase repeated, as it were, opposite itself.

But in this lesson, children must find and use two other ways of balancing. They are very important, and they are continually happening in music

Take this phrase:

Now balance it, not by merely repeating, but by developing it a little. carrying it further unfolding it, as it were:

Here is seen the balanced growth of a tune· as it travels, it gets more interesting.

Now take a similar phrase:

and let us balance it in another way:

This is surprising balance, by a new phrase altogether. New delights are possible in balancing by surprise; but take care that the new thought fits what has gone before.

It is very good practice to look into the ways of famous tunes, especially favourite tunes, to find out how the composers of them use the different ways of balancing,—by repeating; or by developing; or by something quite new, which neither repeats nor develops.

Notes for the scholar.—The three ways of balancing a phrase may be called:

(1) Balance by echo.
(2) Balance by unfolding.
(3) Balance by contrast.

They are all useful and all can be used in the same tune if desired. For practice, take any phrase and give it the three different kinds of balance (see Phrases above).

SONGS

I. BOBBY SHAFTO

II. THE SCARECROW

(Three times through)

SCHOLAR'S OWN TUNES

I.

Wilfrid Thorley

II.

XLII. ON TWO PEALS OF BELLS THAT AGREE

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

In this lesson the children are to think of and practise a good way for two teams to sing in two parts They have perhaps sung Rounds. But a Round is not a Part-song. It is a single melody starting at different points and overlapping, so that it sounds as a Part-song and yet is but one melody.

But a Part-song is made of two or more melodies running at the same time. It is companionship in music.

As a start in part-singing, and in part-writing, pretend that your two teams are two peals of eight bells. The first team peal out their eight bells from top *Doh* to bottom *Doh* in any order they like, but in common time, starting on the second beat

The second team peal out all their bells from bottom *Doh* to top *Doh*, not in any order they like, but according to the following two Rules

(1) They must strike each of the eight notes or bells once, and only once, in any given peal.

(2) Their middle six bells (between the lower and upper *Doh*) must be so chosen as to make always either a sixth or a third with the first team's bells. Thus, in every single case, the

peals will begin with an octave and end with an octave, and make nothing but sixths and thirds in between.

(The scholars should be helped to avoid, so far as they can, putting bells 4 and 7 next after each other.)

Here are three specimen peals, keeping the rules of the game:

Each scholar should sing the various peals many times over before deciding which are the best. They should also be encouraged to sing them to any line of words they like; for example:

Ring out the old, ring in the new!
Ring out the false, ring in the true!

Or, if preferred, to *Ding, dong, ding, dong,* etc., or any other sounds.

Notes for the scholar.—For this lesson make the following Rules:

(1) Start a peal of eight bells from any top *Doh* to bottom *Doh.*

(2) Start a companion peal on the bottom *Doh* and move through all eight bells ending on top *Doh,* but striking each bell once only.

(3) Make bells 2 to 7 (inclusive) of the second peal make *thirds* or *sixths* with the middle six bells of the first peal

(4) If you can, avoid sounding bell 4 immediately after or immediately before bell 7; but if it is hard to avoid it then try to sound bell 2 immediately before or after them both.

SONG—DING DONG

Words supplied by Walsworth School, Hitchin

SCHOLAR'S OWN TUNE

Lord Tennyson

XLIII. ON ADDED THIRDS AND ADDED SIXTHS

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

Following upon Lesson Forty-two, it will be easy and interesting to study adding thirds and sixths to existing tunes Where tunes go high, sixths or thirds may be added below them:

But as they come down low only thirds are suitable, sometimes above, sometimes below:

When the original tune passes step by step up or down, a string of three, or four, or more added thirds or sixths sounds rich and delightful. But where tunes leap, it is necessary to mingle the sixths with thirds in such a way as to make a smooth companion melody with, as it were, a mind of its own. For example, to a melody such as this:

it is best to try to add a smooth part making at one moment sixths, at another thirds, e.g.:

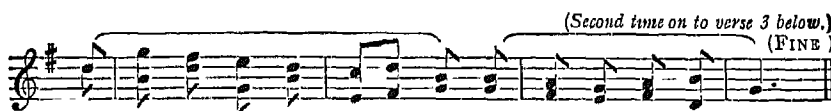
Notes for the scholar.—To some phrases you can add strings of thirds or sixths or both. Do you know this from a Beethoven Sonata?

But to get a good companion melody, mingle thirds and sixths.

Country Rhymes

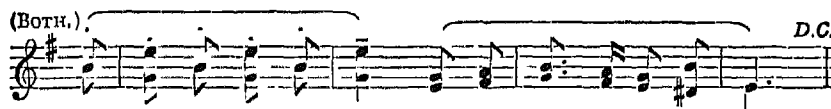
SONG—MAY DAY

1. Good morn-ing, lords and la - dies, It is the first of May,

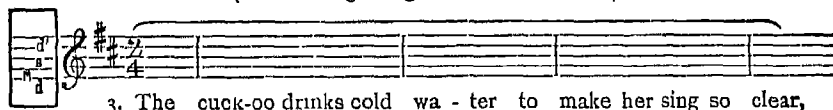
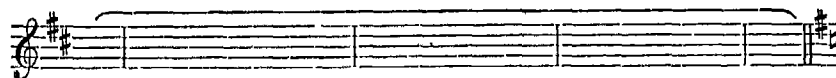
(*Second time on to verse 3 below.*) (FINE.)

We hope you'll view our gar - land, It is so sweet and gay.

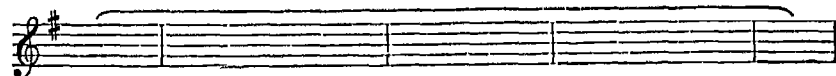
(1st VOICE.) (2nd VOICE.)

2. The cuck-oo sings in A - pril, the cuck-oo sings in May,

(BOTH.) *D.C.*

The cuck-oo sings in June, in Ju - ly he flies a - way.

SCHOLAR'S OWN TUNES

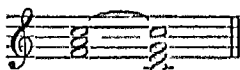
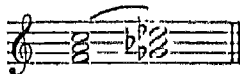
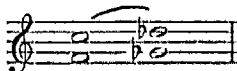
(continuing song for lesson above.)

3. The cuck-oo drinks cold wa - ter to make her sing so clear,

And then she says Cuck - oo! Cuck - oo! for three months in the year

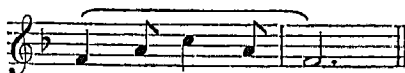
I love my lit - tle bro - ther and sis - ter ev - ery day,

But I seem to love them bet - ter in the mer - ry month of May.

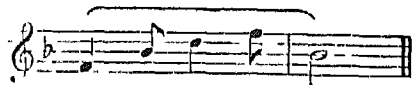
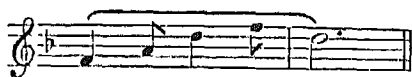
XLIV. ON CHORDS THAT ARE FRIENDS

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

The two ways in which chords may be friendly, or well and truly related to one another, can well be compared to *blood-relations* and *neighbours*. When two chords have a note or notes in common they are kinsfolk, e.g.:

When they have no note in common the only way they can be related is by nearness of sound or *neighbourliness*, e.g.:

and in this case, even though they are near neighbours there is great danger of their sounding very abrupt when a piece of music moves from one to the other, because of what are called the "consecutive fifths":

The neighbourly relating of chords is none the less real, especially when they are only half a tone apart.

The most fitting and by far the most useful way of teaching children to think of chords as friends is to show them how to link up chords with one or two notes in common. Give them any key-chord to think and sing, e.g.:

and then let them find the three notes of any other chord which has either one or two of its notes in common with this key-chord, for example:

which has C in common; or

which has F in common; or

which has both F and A in common When search has been made for pleasant neighbours among the six common chords to be found in any major scale, the children will find it very interesting to make up chord-like melodies that have kindred chords in each successive line (see Rhythms and Phrases).

Note for the scholar.—Chords are friends whenever they have either one or two notes in common.

SONG—THE JOLLY TESTER

SCHOLAR'S OWN TUNES

XLV. ON A FRIENDLY DRONE OR "PEDAL"

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

When chords are in the mind at the back of melodic phrases, it is but a step to think harmonies to tunes Following upon the previous lesson, the children will find the ancient usage of a drone pedal, or two drone pedals, very interesting, and it will teach them to think of melodies and chords as naturally linked. A *soh* or dominant pedal is easiest to think, because it makes no harsh sound whatever with any of the degrees of the natural scale The primitive piano piece called "chopsticks" illustrates this:

But a double pedal (made of *doh* and *soh*) is also possible (see Scholar's Tune below). Children should be made familiar with the following famous and useful progression in three forms, in which the dominant pedal note may occur as an inverted pedal above, or in the midst, or below the two-part progressions

Notes for the scholar.—A *soh* or dominant pedal or "drone" can be held with any tune in the world which keeps to the notes of the natural scale. It is good practice to think of a drone note while you sing or make up a tune. But never be tethered to it, (as you sometimes see a goat by the wayside tethered to a peg in the ground). It must be your servant, you **must** not be a slave to *it*.

SONG—DOCTOR FAUSTUS*

1 Doc - tor Faus - tus was a good man, He whipt his schol - ars now and then, 2

2 Those he whipt he made them dance Out of Eng - land in - to France, 3

3 Out of France in - to Spain, Then he whipt them back a - gain! D.C. 1

A drone part to this can be sung, played, or hummed on D and G thus:

* When sung as a Round (3 in 1) the first singer sings all the song three times through, the second singer sings it through twice and two thirds, and the third singer twice and a third, then all are ready for the final bar, firmly and loudly sung together.

SCHOLAR'S OWN TUNE

THE WATCH-MAKER'S SHOP

From "Punch"

XLVI. ON RHYTHMS SUNG ON CHORDS

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

"Drones" or pedals tend to focus or *centralise* the thoughts of a melody. Central thinking is perhaps the chief aim of this lesson also There seems no better way of laying down a rhythm before writing a free and lovely tune in that rhythm, than this of singing the rhythm that you have laid down (and that many times) to your chosen chord.

But a good second aim of this lesson, and a very practical one, should be the great benefit to team work in music gained by singing agreed rhythms on an agreed chord. In practice it is well to begin slowly and softly, and with great precision: if singing to words (that is, to a speech-rhythm) let the words be especially well-edged with their consonants: if for an "own tune" without words, use *fa-la-la* or any other chosen syllables to give precision to each phrase It is possible to apply this practice to almost any song, and certainly to any quick instrumental tune without words.

Notes for the scholar.—It is great fun, and very easy, to sing rhythms on any one chord you choose It may be a *Doh-Me-Soh* major chord, sung by three of you getting together—one for *Doh*, one for *Me*, and one for *Soh* or it may be a *Lah-Doh-Me* minor chord, which you can sing in the same way.

The keynote of every tune is, as we have seen, a kind of "King of the Castle," and the actual key-chord is rather like his fortress or castle. Sing your rhythms to your key-chord before you write your tune.

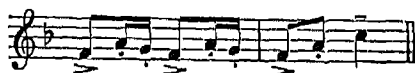
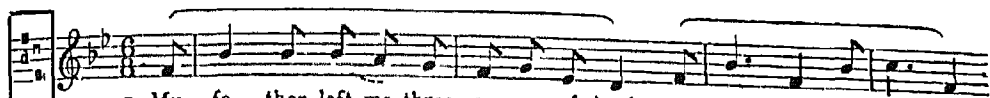
SONG— SOMEONE

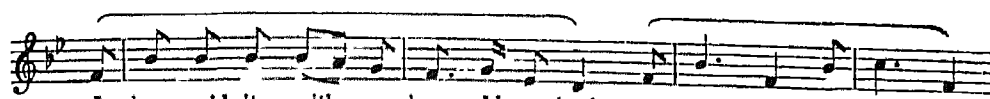
Walter de la Mare

XLVII. ON PHRASES FIRST AND LAST

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

When there are only two in a class, one child is first and the other last! And to write tunes with only two phrases is very good practice for tune-writers in the art of distinguishing between the character of first and last phrases. Look at phrase (1) above. It is clearly not a last phrase. Again look at phrase (4). It clearly *is* a last phrase by nature. Where lies the difference? And what is it that gives (2) a sort of half-ending and half-not-ending character? A first phrase is known by its spirit of adventure. It ventures out from home. A last phrase is known by its "homing" spirit, and by its tendency to complete or round off the journey Of all the ways in which these two characters can reveal themselves, it seems well to teach the children to think of phrases first and last as "journeys out and home." Hence the keynote or "final" (as it always used to be called) will settle the fate of melodies, and the key-chord will settle the fate of harmonies. Concentrate first upon the former, and broadly speaking suggest the wisdom of starting from "home", and after settling that it *is* your home whether by fleeting ways or by demonstrative ways, such as this:

then venture out and away to other centres, reserving your real return home for the last phrase, e.g.:

In the replies to phrases (5) and (6) above, let one reply be non-final in its thoughts and behaviour, and let the other sound absolutely final if that be possible.

SONG—MY FATHER LEFT ME THREE ACRES OF LAND

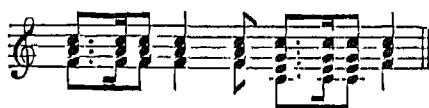
SCHOLAR'S OWN TUNE

Scholars should try to get a good "spire" or rising phrase in the third line of this tune (see Lesson XXXIX)

XLVIII. ON RHYTHMS SUNG TO TWO CHORDS

RHYTHMS AND PHRASES FOR THE LESSON

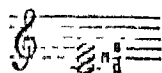
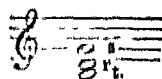
TEACHING NOTES

This lesson follows of course on Lesson 46 and is embodied in *Notes for the scholar* below. The rules there given for singing out rhythms to two chords are illustrated in the rhythms and phrases of this lesson. But it should be specially noticed that the three-part application of the chord-game, while it automatically gives all three notes of each chord to the singers, does not, by the nature of the case, give the so-called "root-position" of the second chord.* This can be automatically done by a fourth voice—either supplied by the teacher, or on any instrument—and will make safe four-part harmony in every case, according to the accepted rules of the game. For example:

which combines (1) and (2) above And it will be seen that (3) and (4) are also written so as to combine in a similar way.

Notes for the scholar.—After you have sung your favourite rhythms to one chord, you will begin to wish for more than one chord. Let us find the easiest way of getting two chords to work.

* The so-called *root* of a chord has always a third and always a fifth above it. It may have other notes added, but these two are constant.

Here are some good rules:

(1) Choose for your second chord one that has at least one note the same as the first chord. For example, if you start with the *Doh* chord:

the *Soh* chord:

follows it nicely, because the note *Soh* is a strong note in both chords:

(2) Always start and end your rhythm with your chief chord.
(3) Change to your second chord on an accent about halfway through the rhythm.
(4) When moving from one chord to another, let each voice go to the note that lies nearest it. This will make the chord-game a smooth one.

SONG—HUSH-A-BYE, BABY

(To be sung as a Round 4 in 1)

SCHOLAR'S OWN TUNES

I.

(Each line of the melody to be thought on two of the three given chords in *Rhythms and Phrases* 5 and 6, p. 628).

II.

(To be written as a Round)

XLIX. ON ROUNDS AND HOW TO SING AND WRITE THEM

RHYTHMS AND PHRASES FOR THE LESSON

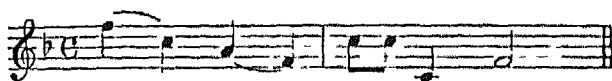
TEACHING NOTES

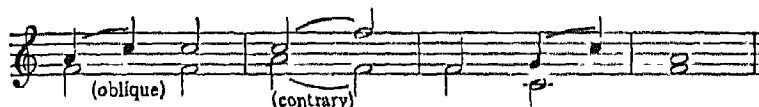
The Scholar's Notes below will need a little enlarging as the children attempt more elaborate rounds. No further instruction in harmony is attempted in this section, but a few first hints to teachers are offered for the follow up of this inspiring, happy game of making rounds for school use:

1. (*a*) Let the first phrase of the round be pivoted upon *Doh* of the first chord, moving to the next neighbourly note in the second chord (as in the two-chord rhythms) and back again to the starting point·

(*b*) The second phrase will then, in like manner, start on *Me*, move to the next neighbourly note and back again to its starting point:

(*c*) The third will start on *Soh*, and may very well pass through *Me* and *Doh*, and back to *Soh*, provided it does not clash with the other two parts in so doing:

(*d*) If there is a fourth part, it may well start on *Doh* and pass gracefully across the other parts without clashing, returning to *Doh* at the end:

2. (*a*) In all resultant part-writing consecutive thirds and sixths should be favoured between the parts:

(*b*) Fifths and octaves between the parts should be rare, and when they are used, the time-honoured rule of part-writing commends the practice of approaching them in what is called contrary movement, or oblique movement:

(*c*) The constant aim should be euphony, and when possible, the complete chord should appear at prominent moments in the phrases.

Notes for the scholar.—When the two-chord rhythms have been thoroughly mastered, it will be easier to begin to understand Rounds and to make up new ones of your own.

If a tune of four phrases has quite *different chord-thoughts* for each phrase, it may be a beautiful tune but will never sing as a round. If, however, all its phrases have the *same chord-thought* behind them, they will naturally sound well when sung together, and the scholar will be halfway to a round.

If, as well as this, you take care that your first phrase moves round *one note of each chord in the chord-thought*, while your second phrase moves round another note of the chord-thought, and your third phrase round another, and your fourth phrase only moves from what is called "root" to "root" of the chords used, you will have found the secret of making a tune of four phrases that will sound well when sung as a round. It will still take a lot of practice to make a smooth and good round tune. Try your hand at it with the words given below, starting with the first phrase as set.

SONG—MISTRESS MARY (An exercise in the common chord).*

* This may be sung as a canon 8 in 1 by eight children starting at a bar's distance after each other.

SONG—LONDON'S BURNING

SCHOLAR'S OWN TUNE

(NOTE: It is a good plan to sing the whole through in unison before dividing into parts.)

L. ON COMPANION MELODIES

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

The effect of a chord e.g.: [musical example] is an effect of completeness.

But the effect of a bare octave: or of a bare fifth:

is rather the effect of framework or "sinew" or "bone" which awaits completion or clothing. And the thirds and sixths have again a different effect, not of completeness itself but of something that suggests clothing, and gives character. So two-part writing in music nearly always avoids the bare octaves or fifths between the parts, and relies upon sixths and thirds for giving the needed suggestion of completeness, character, clothing and often of grace. The best working rule to give the children is that they should use thirds and sixths freely, and mingle them so as to give the two parts freedom of movement. They can begin and end with an octave or unison, and have whole unison phrases here and there, if they like, but in the body of their piece they should seek to use thirds and sixths, and often this is best done by *crossing the parts*, the top part going below the second and *vice versa*. For example: Phrase (1) above is fitted by phrase (2). They make perfect companion melodies. So do phrases (3) and (4). Phrase (5) shows how jolly thirds above or below a phrase can sound; and phrase (6) mingles thirds and sixths.

Notes for the scholar.—Companion melodies sound most friendly when they run in mingled thirds and sixths with each other. Try to give them melodious forms of their own which yet fit perfectly with each other. It is good to begin and end with an unison or an octave.

SONG—Y BORE GLAS (The Fine Morning)

Tr. A. L. Salmon

Welsh Folk Song

SCHOLAR'S OWN TUNES

I. Catching Fairies

LI. ON A PHRASE A THOUGHT

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

The idea of a phrase a thought, and in singing, the idea of a phrase a breath, should be inculcated as early and as often as possible. But as the children advance, the longer thought begins to make the longer phrase (and incidentally the longer breath too)! A musician's phrase is the counterpart of a poet's sentence. Often *the line* looks like a phrase, as a line of poetry looks like a sentence, when truly it is only part of a long-minded phrase or sentence. Also (as in poetry) musical phrases are often apt to be short and forcible like a poet's interjections or ejaculations. So the children should be helped to take interest in phrases long and short. Beethoven's famous

in the Fifth Symphony is like a mighty interjection in music, and Bach's powerful Choral Prelude "Wachet auf" is like one vast musical sentence from start to finish. But in addition to leading the children to get interested in, and distinguish between ejaculatory and long sustained phrases, care must be taken to show them how one phrase can contain and consist of two or more smaller phrases. Phrase (1) above is undoubtedly but one phrase in itself—one thought. But phrase (2) is equally [illegible] thought (and in a broad sense) one phrase; yet it is undoubtedly divisible into three little phrases or mental transactions. Similarly phrase (3) is one phrase; so is (4) yet it is made up of three phrases! And by adding a few notes to it in phrase (5) we have done away with the feeling of three phrases and actually compelled it into one continuous transaction again. In music, as in nature, an infinite number of beautiful sub-divisions seem possible in that which is a truly indivisible whole. Encourage "long-minded" love of long phrases in the children, together with a taste for analysing the parts of a tune and seeing how they grow.

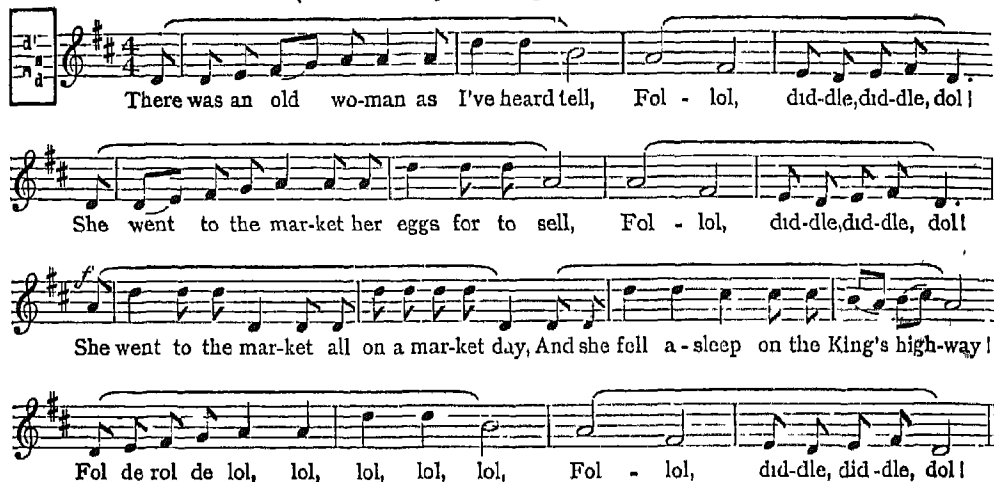
SONG—SING A SONG OF SIXPENCE
Sing a song of six-pence, a pock - et - full of rye, Four and twenty blackbirds baked in a
pie, When the pie was opened, the birds be-gan to sing; Was not that a dainty dish to
set be - fore the King? The King was in his count-ing house, coun-ting out his money; The
Queen was in the par - lour eat - ing bread and hon-ey; The maid was in the gar - den
hang-ing out the clothes; There came a little black - bird and snapt off her nose.
R. L. Stevenson
SCHOLAR'S OWN TUNE
Jauntily
1. O it's I that am the cap - tain of a ti - dy lit - tle
2. For I mean to grow as lit - tle as the dol - ly at the
3. O it's then you'll see me sail - ing through the rush - es and the
ship, Of a ship that goes a - sail - ing on the pond, And, my
helm, And the dol - ly I in - tend to come a - live; And, with
reeds, And you'll hear the wa - ter sing - ing at the prow; For be -
ship it keeps a - turn - ing all a - round and all a - bout: But when
him be - side to help me, it's a - sail - ing I shall go, It's a
side the dol - ly sail - or I'm to voy - age and ex - plore, To
I'm a lit - tle old - er, I shall find the secret out, How to
sail - ing on the wa - ter, when the jol - ly breezes blow, And the
land up - on the is - land where no dol - ly was be - fore, And to
send my ves - sel sail - ing on be - yond.
ves - sel goes a - di - vie - di - vie - dive.
fire the pen - ny can - non in the bow.

LII. ON WRITING TUNES OUT WHILE HEARING THEM

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

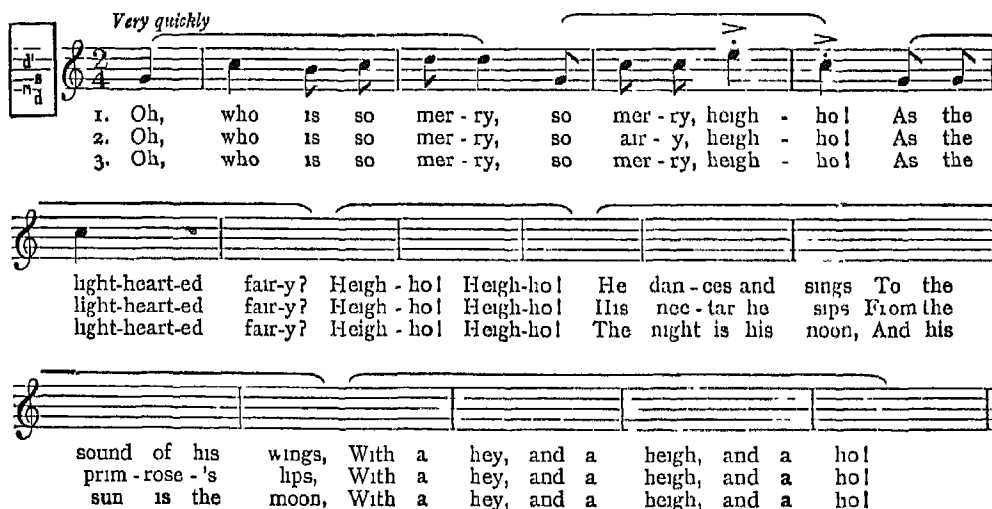
It will be obvious that the whole secret of being able to write out simple words on hearing them spoken is to be able instantly to conjure up before the mind's eye the look of them on the written page It would be perfectly useless, for example, to tell children to write "cat and dog" on the board on hearing it, if they had no clear picture of what "cat" looks like when written! Therefore no attempt can possibly be made to teach children to write out tunes till long after they have the picture of familiar intervals and phrases *as they look on the stave* in their mind's eyes, and not until that picture *is* actually evoked by the sound of the familiar intervals and phrases. This is nothing like so hard as it may at first seem. Show the children the look of the chord for example on the stave:

Next show them the look of a rhythm·

Then play these two over and over a few times while they look at them, and then tell them you are going to put the two together:

Play this several times, and ask the child to take a clean sheet of music paper and write down whichever of the three above examples you play, directly you play them. The process may be slow the first time it is tried. But use will soon break the back of the difficulty. Phrases (1) to (6) above have been framed with a view to giving typical shapes of intervals and phrases. Customary intervals, chord-forms and scale or passing-note formations can be practised with advantage. But concentration on making children write down the above six phrases in various keys may be exceptionally helpful

Notes for the scholar.—Get used to the look on the stave of a few tunes that you know well like *John Peel* and *God Save the King* Then ask any one to play any bit of any of them, and try writing that bit down as you hear it. Then see if you were right. Go on trying till you can play this particular game well. It will help you in every way to make your eye and ear work together There seems no other way to become a good, fluent reader.

SONG—THERE WAS AN OLD WOMAN*

(18th Century Country Dance Tune)

SCHOLAR'S OWN TUNE

Anon

THE LIGHT-HEARTED FAIRY

* For the whole song see Mrs. Macbain's *Standard Book of Traditional Songs and Tunes for Little Folk*

LIII. ON HINTS FOR THE SINGING TEAM

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

Three hints for the singing team may be offered here:

Hint I. Phrases (1) and (2) above are planned to give an exercise of permanent use to develop strong pure tone in the team The vowel *o*, or the vowel in the word *Lord* will be found most useful for this purpose There seems scarcely a child who cannot acquire strong, healthy and beautiful sounds on the word *Lord* on either the note E or D:

But the writer has found it an inestimable boon to adopt a fairly vigorous rhythmic exercise, such as phrases (1) and (2) give, and encourage the children to throw their whole energy into the rhythmic delivery of the phrase, attending particularly to the quality of the note E, and getting it ever stronger and purer. From this "prescription" it would seem that (except in a few rare cases where a child can shout up a "chesty" note as high as that) nothing but good tone can emerge; and it soon becomes the asset of the whole class The exercise may be transposed to meet exceptional voices

Hint II. Phrases (3) and (4) above are planned to illustrate the singing team's practice game of what may be called "target-shooting." The leader with voice or instrument proposes an exact note for target, haphazard, on the 1st and 3rd beats of the bar; and then the whole

team replies with a clean aim on the same note. *The note must never be held* Soft target-shooting is difficult and intensely useful for giving certainty of attack

Hint III. Intensely sustained singing, *pianissimo,* by the whole team for a few moments daily will, if practised with scrupulous and listening care by all, attain perfect tuning and toning as nothing else can. The children, if out of tune, must go still more slowly, and still more softly, till each note has been as it were *listened into tune.* Let them vie with each other in this delicate game Phrases (5) and (6) are specially planned to show the kind of phrase that should be chosen for this practice of toning and tuning *in* sustaining.

SONG—A FARMER WENT TROTTING

School Tune

E. J. G. SONG—AN OLD SACRED LULLABY *Corner.*

SCHOLAR'S OWN TUNES

LIV. ON THE SOLFA NAMES AND THEIR USEFULNESS

RHYTHMS AND PHRASES FOR THE LESSON

TEACHING NOTES

Show the children the use of the syllables as *names whereby they will always know and recognise the degrees of the scale*, as securely as they recognise the members of their own family by their various names But as soon as this is grasped, show them the real use of the syllables as names whereby they can always recognise the *relation* of two or more notes in the natural musical family called the scale. To use the syllables for merely naming the scale is rather like using names for a mere roll-call! To use them for a key-chord—**d m s d'**—is good, but it is fatal to restrict it to this. They should be as freely used in every way as the names of us all, not only to show *what note is present* (in any chord or scale or phrase) but as a permanent reminder of the permanent relationships of notes with one another To teach this, tell a little family story, say of "Father, Mother, Freddie and Mary." Describe the characters first; then name two of them (e.g. simply say: "Mother and Freddie") and leave a pause. Ask the children what they see in "their mind's eye". Do they see mother and son together the moment they hear the two merely mentioned? Then name three:—"Mother, Father and Mary"—do they now see another picture? and do the family look as though they were happy together, and would they recognise them again? This gives a picture of the true use of solfa names. Now say the names "Doh-me-soh." Ask the children whether they can *hear them together with their mind's ear*? If so, they are now making true use of the solfa names. When all this is fairly understood, the children can be encouraged to relate every note in the scale to Doh: **Doh ray, Doh me, Doh fa,** etc. etc. Secondly let them

relate every degree to **Soh**: **Soh fa, Soh me, Soh ray,** etc. etc. The phrases above have been specially chosen for syllabic naming. Let the children get thoroughly used to the composite names· **Doh-me-soh** and **Fa-la-doh** so that the mere mention of them calls up the image of their permanent relation and sound with one another. The chord **Fa-soh-te** in Phrase 4 is a very commonly used group. Following upon the relationships set out here, others should be made up by the children and given their names, and they should be encouraged permanently to think of groups or relationships of notes by their composite group-names Any difficult interval or phrase on the stave can be explained by name, and the difficulty will be the sooner grasped and dealt with. The use of the chromatic syllables need not be delayed. They should be allowed to come up for study in the ordinary course of tunes that modulate. But the superlatively important thing throughout in using solfa syllables is to encourage the children instantly to associate the names of any two notes named with the thought and *mental hearing* of the relationship of those notes with one another.

SONG—ST. BRIDE

SONG—THE NORTH WIND DOTH BLOW

Written by a schoolchild aged seven

SCHOLAR'S OWN TUNE

(Scholars to write a new tune for the second verse that brings a change of key and yet fits well with verses 1 and 3)

Ella Wheeler Wilcox

FIVE LITTLE BROTHERS

CONCLUDING NOTE

HERE this Section must end It leaves the writer anxious to offer his apology that only the bare fringe of the teacher's musical task has been touched, and that in outline only It can but supply a course of friendly suggestions to fellow teachers who are kind enough to study the Introduction and use the Teaching Notes These come from one who, having taught music for nearly fifty years, and chiefly to the young, is now fairly clear in the conviction that it must be taught far more in our schools as an indispensable thing. It must surely be taught not as a book-subject, but rather as a joy to be experienced and a pursuit to be practised. Who could teach children needlework, for example, as a book-subject, showing the luckless pupils other people's designs but never letting them try a design of their own? Music can, as has been proved, be taught to average children as a living *pastime* and as the team-subject of unique discipline which it happens to be.

It remains to point out that the chief gramophone firms will supply any teacher with a list of suitable records of rhythmic melody—such as Handel's *Alcina* music, Haydn's *Clock Symphony* (both H.M.V.), and such charming juvenile music as the *Toy Symphony* (well recorded by Columbia)

And now, Farewell, gentle reader! If you are teaching this our divine subject of music to the little ones, the writer (in the Psalmist's words) would wish you "good luck in the Name of the Lord"

WALFORD DAVIES

A PLAY FOR THE FOURTH YEAR'S COURSE

"SIMPLETONS"

People in the play—JACK FALCONER (a young highwayman) ROBERT ASHTON (a farmer of twenty-two). MRS. ASHTON (Robert's mother, a widow of forty-five). MARY and NANCY (Robert's younger sisters) DAVID LAMB (a simple-minded rustic) EFFIE (a maid-of-all-work). FOUR BOW STREET RUNNERS, only two of whom have speaking parts.

Scene—A farmhouse kitchen, furnished as plainly as possible. Door L leads to front room and upstairs Door C. leads out-of-doors Door R leads into the dairy A table is covered with breakfast crockery (unwashed), the remains of the bread, butter, etc A farmer's smock hangs on a nail on Door R

Time—Early eighteenth century.

[*Mrs. Ashton enters the kitchen from Door L. and looks annoyed to find no one in the room She approaches Door C which is wide open—and calls loudly for the servant*]

Mrs. Ashton. Effie! Effie! Ef-fe-e-e!

Voice (*from outside*). Coming, Ma'am.

[*Effie enters*]

Mrs. Ashton. Wherever have you been gadding off to this time? Upon my word, I never come into this kitchen but I find the door staring open and you nowhere to be seen.

Effie (*simply*). Don't you want the ducks to be fed, Ma'am?

Mrs Ashton. Ducks don't want feeding every half hour of the day. What about your work? Do you think I want the breakfast-pots lying about all the morning? What do you suppose I pay your wages for?

Effie (*tempted to be impudent, then suddenly becoming submissive*). I'm sorry, Ma'am. I'll soon make up for lost time.

[*Effie prepares to wash up*]

Mrs. Ashton (*sitting down*). About time, too. Good gracious, child, we shall have to start getting the dinner in directly.

[*Effie walks to and fro, constantly glancing through the open doorway. Mrs. Ashton eyes her critically while she continues her harangue*]

There's never a moment for any of us to sit down. (*Eating bread from the table.*) It's

feeding other people from morning to night till I'm sick of the sight of food That's the worst of work in a farmhouse—you've never finished. If it isn't the men we're feeding, it's the pigs. As soon as you've fed the pigs, the calves begin bellowing. Then the cat yowls every time you look at a saucer, and what with the hens and ducks and turkeys. . . . (*Sharply.*) Effie, what is there out of doors yonder? What is it you keep looking at?

Effie (*innocently*). Nothing, Ma'am. Only the ducks and things, Ma'am.

Mrs. Ashton. There's something — or somebody! Are you expecting anyone? If you don't keep your mind on what you're doing, you'll be smashing that crockery next. And then where will your wages be?

[*She goes to the door, gazes out, sees nothing unusual, closes the door, and looks at Effie reflectively*]

Mrs. Ashton. I know! I know!

[*Effie looks up but remains impassive.*]

It's those Bow Street Runners that went past. Girls always did turn silly at the sight of scarlet. Why, girl, they've been gone an hour ago. They'll be miles and miles away by now. Just you forget all about 'em and keep your mind on your own business.

[*Exit by Door L.*]

[*Effie tiptoes to the outside door C. and peers out; then returns to her work of washing up She is obviously uneasy for once or twice she peeps through the window. Obviously, also, she is afraid lest Mrs Ashton should catch her in the act.*]

Effie (*mockingly*). And then where would your wages be!

[*Suddenly, without the slightest warning, the outside door C. opens, and Jack Falconer appears He is breathless and behaves like a fugitive. Effie signs to him to keep silent*]

Falconer. Hide me, quickly, Effie. I'm in danger. Show me a place where no one will look. . . .

Effie (*looking round desperately*). Oh, Jack! You've dodged them! You've escaped!

Falconer. Yes, yes. But they're on my track There isn't a moment. . . .

[*Mrs. Ashton's steps are heard*]

Effie. In the dairy! Quick! (*Exit Falconer by Door R.*)

[*Mrs. Ashton enters. Effie is washing pots at a furious rate*]

Mrs. Ashton (*suspiciously*). Has somebody been here?

Effie (*with astonishment*). No, Ma'am!

Mrs. Ashton. I thought I heard voices!

Effie I may have talked to myself, Ma'am. I do sometimes, you know. Just for company as you might say.

Mrs. Ashton Who opened the outside door?

Effie. Oh, I did, Ma'am. I just threw the crumbs out to the hens.

Mrs. Ashton I think, p'r'aps, we'd better keep the door bolted to-day. Mr. Robert tells me the Bow Street Runners have work to do in this district Jack Falconer and his gang are to be rounded up at last. We don't want anybody running into our house.

Effie. Oh, Ma'am, I'm frightened!

Mrs Ashton. You needn't scare yourself, child

Effie But, oh, Mrs. Ashton, wouldn't it be dreadful if——

Mrs Ashton. If what?

Effie. If one of those horrible highwaymen came into this house! I'm goose-flesh all over at the thought of it.

Mrs. Ashton. Well, keep the door bolted as I told you. And don't go gallivanting round the farmyard when you ought to be indoors. There's no danger yet. (*Shot, off.*)

Effie. Oh, Ma'am, they're shooting him.

Mrs Ashton (*coldly*) Nonsense. Robert was out since morning shooting wood pigeons.

Effie. I *am* so frightened!

[*Enter Mary and Nancy from upstairs in a state of excitement*]

Mary. Mother, isn't it thrilling! We've been watching from our bedroom windows.

Mrs Ashton What's happening, Mary?

Mary. The Bow Street Runners. They've been in our wood Didn't you hear the shots?

Nancy. They're trying to catch somebody. It must be Jack Falconer and his gang. I do hope he won't be caught.

Mrs Ashton. Have you taken leave of your wits, Nancy? You goose! I hope he *will* be caught. Men like that lurking close to our house night and day, attacking travellers and robbing mail coaches. It's high time they were caught and *hanged.*

Nancy.
Mary. } Oh, Mother!

Mrs. Ashton. I'd show the scoundrels if I'd my way. Of course you girls think them dashing and handsome—there's Effie like a cat with St. Vitus' dance—all over the place. Shame on you, the three of you!

Mary. But, Mother, Jack Falconer isn't an ordinary, common thief. He is always gallant to ladies.

Nancy. And he never harms the poor.

Mary. And he is wonderfully handsome—so people say.

Nancy. I've heard tell that he has been seen round about our house I have seen a splendid young fellow——

Mrs. Ashton Such nonsense! If Jack Falconer has been hanging round our house people will say he's after one of you two girls. Let me catch anybody—I'll teach him!

Nancy. I do hope he gets away, anyhow. It would be dreadful to hang a young man like him

Mary I think so too But, Mother, suppose we had the chance to save him. Suppose we could hide him away somewhere where the Bow Street Runners couldn't find him. Wouldn't it be romantic!

Mrs. Ashton And we should be liable to romantic imprisonment for harbouring a criminal. No, Mary, it would be a pleasure as well as a duty to hand him over to justice.

[*Effie looks round furtively but keeps uncannily quiet*]

Mrs. Ashton. A disgrace to the neighbourhood, he is. Handsome! For all we know the devil himself may be handsome *and* very gallant to ladies. Jack Falconer, indeed! I hope and trust he'll be caught and hanged Hanging's far too good for him, the scamp!

Nancy All the same, Mother, he's never hurt us nor anybody belonging to us.

Mrs. Ashton. If you think that man is hanging about here to pay his gallant attentions to you, Nancy . . .

Mary (*sharply*). Why to Nancy?

Mrs. Ashton. Or you either, Mary. You're a couple of silly geese . . . and Effie's another. The Bow Street Runners have turned her head. At any rate, she isn't going crazed over a rogue and a lawbreaker.

[*Enter Robert noisily*]

Robert. Mother, you've heard the news! That scoundrel Falconer is in this neighbourhood again. He's been seen in our wood. Some people say he's been seen coming near our house. We must keep the doors and windows fastened. . . . He may be hiding in one of our barns.

Mrs Ashton. Robert! How dare he!

Robert. He'd dare all right—the thief.

Mary (*quietly*). Why what would you do, Robert?

Robert Hand him over to justice and go and see him hanged. There's a reward for him—a reward!

Mrs. Ashton How much?

Robert (*impressively*). Fifty pounds!

Mrs Ashton Fifty pounds. Fifty! You mean fifty shillings!

Robert. Pounds, Mother. Fifty pounds.

Mrs Ashton (*eagerly*) Go and catch him, Robert

Robert. And risk getting a bullet through my head?

Mary (*sarcastically*). But—fifty pounds, Robert, for a mere bullet.

Robert. Oh, you girls can talk lightly. You're safe in the house. We protect you from danger. We lock the doors and windows——

[*Locks outside door.*]

Mary. You can't go out to help if you lock the door. *You* go out and we'll lock it after you.

Robert. Little you'd care if I got a bullet through me

Nancy (*cheerfully*). He might miss you, Robert, and think how thrilling that would be It must be wonderful to hear it whistle close past your ear.

Robert (*dolefully*) Seems to me you women want me to get killed.

Mrs. Ashton. Take no notice, Robert. Stay indoors with us if you're frightened. We'll look after you

Nancy. I wish I were a man

Robert So do I wish you were. You'd talk a bit of sense then—for a change.

Nancy. I wouldn't talk I'd *do*!

Robert What would you do?

Nancy. Catch that man!

Mary. I wouldn't. I'd help him to escape

Robert. You'd—— (*Too overcome to speak.*)

Mary (*slowly*). Help—him—to—escape.

Robert. Are you quite mad?

Mrs. Ashton. The girl thinks he's a gallant gentleman, and fancies he's in love with her.

Nancy. With one of us

Mrs. Ashton. He has been hanging round here several nights and the silly girls have got it into their heads——

Robert. He'll be hanging round all right —swinging to and fro from a good oak tree —crows picking the nice bits out of him

Nancy (*fiercely*) You beast, Robert!

Mary. They won't catch him.

Robert Won't they! The Bow Street Runners have made a circle round the district and the circle is closing every minute. They're bound to catch him. That's why I want this door locked—to keep you girls safe

Mary. And to keep our big brother safe.

Nancy. Robert's far more frightened than we are.

Robert. That's because I have more imagination. You women don't realise the risks.

Nancy (*with disgust*). You're a coward!

Mary (*sarcastically*). So he is. Even fifty pounds won't make a man of him.

Mrs. Ashton. Robert, you must take no notice of all this cackle. Do exactly what you feel you ought to do If you think it a man's duty to help in ridding the country of a scoundrel—go! If you think it better to stay at home and protect your weak, defenceless sisters——

Robert. I certainly ought to stay here, but as Mary and Nancy can do nothing better than poke fun at me, and misunderstand——

Nancy Oh, we understand all right.

Mary. Perfectly.

Robert. I shall go. Against my best instincts and all my common sense, I shall go I may be slain: in all probability I shall be. When you see them bringing me back, you'll think of all the cruel things——

Mary (*ironically*) Don't, Robert! Don't go!

Nancy. No Don't go, Robert.

Robert (*desperately*). I will go. It is too late to stop me now

[*Opens outside door and walks out as if to his own funeral*]

Mrs Ashton. Poor Robert! He'll not do anything

Nancy. But he may see something really exciting.

Mary. Something romantic! Let's go after him, shall we?

Mrs. Ashton Don't go far away, then. You'll have to help with the dinner.

Mary. Come on, Nancy

[*Exeunt Nancy and Mary*]

Mrs Ashton. Oh, what a fuss!

Effie. Oh, Ma'am, I'm so frightened

Mrs Ashton. Silly girl! There's nothing to be afraid of

Effie. Mrs. Ashton, I'm not afraid for myself exactly It's not that at all

Mrs. Ashton. What then?

Effie (*nervously*). I'm afraid for—for a friend of mine, Ma'am. He might be coming to see me to-day—I've been sort of expecting him. He promised to bring my boots on his way from market.

Mrs Ashton So that explains the gadding about and peeping through windows. I knew you were expecting someone or other. Who is the man?

Effie. My cousin David.

Mrs. Ashton. And you think the Bow Street Runners are going to hang him! What a silly goose you are, Effie! (*Laughs.*)

Effie. They may mistake him for Jack Falconer, Ma'am, and—and shoot . . .

Mrs. Ashton Does your cousin look so much like a highwayman?

Effie No, but he's rather like Jack Falconer in the features, Ma'am

Mrs. Ashton. How do you know that?

Effie. I've . . . I've heard folks say so.

Mrs. Ashton. What folks have said so?

Effie. Oh, plenty of people.

Mrs. Ashton (*slowly*) I suppose your cousin David doesn't happen to be Jack Falconer, by any chance?

Effie. I don't know what you mean!

Mrs Ashton Are you a fool?

Effie. My cousin David . . .

Mrs. Ashton. Don't worry your head over troubles before they come. No one will hurt your cousin David—unless there's a good reason.

Effie I know I'm foolish——

Mrs. Ashton. That's the truest word you've said to-day. Have done with such nonsense.

[*Exit by Door L*]

Effie (*mockingly*). Have done with such nonsense!

[*She peeps through the window, listens intently, runs into the dairy taking a farmer's smock which was hanging on the door After two or three seconds there comes a knocking on the outside door and Effie reappears from dairy. She opens the outside door, obviously frightened but defiant*]

Effie. Good gracious, David. Come in.

David (*entering*). Alone, Effie?

Effie. Yes—for the moment. I want you to help. Anything important happened?

David. He's dodged so far, Effie, but I am afraid they'll get him. There's a circle round him

Effie. He *must* get away

David. If it can be done——

Effie. It *must* be done.

David We can only hope——

Effie Sh! You can save him. David! Go into the dairy. Quick! You'll see . . . They're coming

[*She hustles David into the dairy just in time Robert hurries in, followed by his mother and sisters*]

Robert. They've not caught Falconer yet but it is only a matter of an hour or two. There are a few hiding-places left—they'll search every nook and cranny till they get him.

Nancy. Will they search this house? How thrilling!

Mary How romantic!

Robert. Of course they will search this house.

Mary. When? Soon? Oh, I do hope they'll come!

Nancy. And my bed is not made.

Mrs. Ashton. Go and make it at once then

Mary. Will they go into the bedroom?

Mrs. Ashton. Of course. They'll go everywhere You'd better go and help Nancy to get straight.

[*Exeunt Mary and Nancy.*]

Effie (*simply*). Shall we have to give them dinner, Ma'am?

Mrs. Ashton. Effie, you silly, silly, silly goose!

Effie I was only thinking about the number of potatoes, Ma'am

Robert (*gazing through window*). Here they come! Mother, they're coming!

[*Effie goes to door as if to open it. Secretes the key*]

Robert. Come away, wench.

Effie. I thought you said——

Mrs Ashton. Keep your head, Effie. Robert will answer the door when they've knocked.

Robert. They're at the gate, Mother.

Mrs Ashton. Ay.

Robert. Here come two of them. The others have gone to the cowsheds

[*A loud knock Robert approaches door—unbolts it, but it refuses to open*]

Robert. The key! Who's got the key?

Mrs Ashton Isn't it in the door?

Robert No!

[*Knocking repeated with violence*]

Mrs. Ashton. It must be there. (*Helps to search.*) Effie, do you know where the key is?

Effie (*faintly*) No, ma'am.

Robert. They can't be kept waiting.

Mrs. Ashton. Run out the other way and bring them in.

[*Robert goes by Door L, followed by Mrs Ashton, Effie hastily opens dairy door and Falconer appears in David's clothes*]

Effie. Keep calm. David must stay there (*Loud whisper.*) Lie low, David! (*Closes dairy door.*) Now you're David—my cousin. Act the simpleton! Stop!

[*Takes key from her pocket and opens door. A Bow Street Runner stands in the doorway.*]

Effie Oh! How you frightened me!

1st. Bow Street Runner. Stay where you are, both of you.

[*Robert, Mrs Ashton, and another Bow Street Runner appear from the other door (L) Effie throws up her arms and pretends to faint*]

Mrs. Ashton. Oh, that girl will be the death of me yet.

1st Bow Street Runner. Don't be alarmed, Madam A little cold water. (*All attend to Effie.*) We're used to these little excitements, you see.

[*Mary and Nancy appear.*]

Mrs. Ashton (*looking at Falconer*). And who might you be?

Falconer. Ah'm David, mum.

Mrs. Ashton. David?

Falconer. Yes'm. Effie's cousin. Ah called with the boots.

1st. Bow Street Runner. Stay where you are, cousin David We'll attend to you presently.

2nd Bow Street Runner. He was here when the door opened. Don't you know him, Ma'am?

Effie (*recovering*). I hid him, Ma'am. I was afraid they might find him and you said no one was to come indoors

Mrs. Ashton. This is your cousin David?

Effie (*slowly*). He's not really my cousin, Ma'am I told you a wicked lie. He's——

Falconer Maybe ah wants to wed the girl one fine day. That's who ah am!

1st. Bow Street Runner. The girl is all right now. We must get to business, Madam. We are searching for a fugitive—a highwayman of the name of Falconer—and demand to search your house. Here is the warrant. (*Shows it.*)

Mrs Ashton. You can search anywhere you like I want the scoundrel caught—the sooner the better

1st. Bow Street Runner (*addressing Robert*). Your name please?

Robert. Robert Ashton.

Mrs Ashton. My son, officer.

1st. Bow Street Runner (*referring to "David"*). And your name?

Falconer David

1st Bow Street Runner David what?

Falconer. David Lamb.

1st. Bow Street Runner. And where do you live?

Falconer. With me mother.

1st. Bow Street Runner. And who is your mother?

Falconer. Mrs Lamb.

1st Bow Street Runner. And where does she live?

Falconer At home—with me feyther.

1st. Bow Street Runner. The fellow's daft! Your address, you bumpkin

Falconer. White Lodge Farm, Pendleton

1st Bow Street Runner. And what are you doing here?

Falconer. Ah've brought Effie's boots They've been soled and heeled and a new patch put on the huppers and ah thought as how ah was coming——

[*During this conversation, 2nd Bow Street Runner peers about the room, under*

sofa, etc, and eventually goes into the dairy Effie watches out of the corner of her eye]

1st. *Bow Street Runner.* Wait a minute, you clown. I don't want to know all your private affairs

Falconer. Ah'm only telling you, friendly like

1st. *Bow Street Runner* Don't waste my time.

[*A shout from the dairy · "Help!"*]

Mary. Oh! How thrilling! How ro—mantic!

[*The whole party—or nearly all—rush to the dairy. Falconer at a sign from Effie steals out by the door. The girl locks it quickly and again "loses" the key.*]

Effie. Oh! What's the matter? Oh, Ma'am! Oh, Ma'am! I'm going off again.

[*The real David in a smock is dragged struggling out of the dairy The 2nd. Bow Street Runner carries Falconer's clothes which he unfolds dramatically*]

1st. *Bow Street Runner.* Jack Falconer, you're caught this time!

David. Dunno what you mean.

[*Effie faints again.*]

1st. *Bow Street Runner.* Where's David?

[*All look round in surprise*]

1st. *Bow Street Runner.* Where's that bumpkin?

2nd. *Bow Street Runner.* Guess he was frightened and ran Never mind! We've got Falconer

Robert Strange where that fellow disappeared! Has he gone upstairs? Or out by the other door?

1st *Bow Street Runner.* Suppose you go and see?

Mrs. Ashton. Mary, Nancy, you come with me. We'll search upstairs while Robert looks in the front rooms.

1st. *Bow Street Runner.* No, Madam. On second thoughts I think we'll ask you to remain here. Now then, Falconer. (*Producing handcuffs.*)

David. Not me! I don't want 'em on me.

1st. *Bow Street Runner.* Afraid there's no option, young man.

David But I'm not Falconer!

1st. *Bow Street Runner.* Of course you tell us that.

David But I'm not. You can ask dozens of folks round hereabouts.

1st *Bow Street Runner.* Then who are you?

David David Lamb.

1st. *Bow Street Runner.* What! Two of them. A pair of lambs!

[*Laughter.*]

David. It's all very well making fun of a man's name——

1st. *Bow Street Runner.* Why not change it? How would Falconer suit you?

David. It would—only it doesn't happen to be mine

2nd *Bow Street Runner.* How do you explain these?

[*Shows the highwayman's clothes.*]

David. I never saw them before in me life.

2nd *Bow Street Runner.* This won't do!

David. Come and axe me feyther an' mother, then They know me if you don't. And Effie knows me——

[*The girl lies motionless*]

Robert I suppose the other wasn't Falconer, by any chance?

Nancy. Oh, isn't this just lovely!

Robert. They may have changed clothes!

Mrs. Ashton. The key's gone again

Robert. Mother, do you know whether this is Effie's cousin?

Mrs. Ashton. I never saw him before. Nor the other either.

Robert. If Effie hadn't fainted——

1st. *Bow Street Runner.* I'm beginning to suspect that girl.

2nd. *Bow Street Runner.* Yes, who locked that door?

1st. *Bow Street Runner.* The bumpkin may have locked us in!

2nd. Bow Street Runner. If so, he's no bumpkin. It was done mighty quickly.

Robert. There's the other door——

1st. Bow Street Runner. Let's fasten this man first, before we search for the other. Now, young man!

[*Presents handcuffs.*]

David No, I won't.

1st. Bow Street Runner. Must we use force then?

David. I'm not the man you want.

1st. Bow Street Runner. Hold out your hands.

David. Not of my own free will

1st. Bow Street Runner. Against your free will then. Now come, Falconer. This won't do! You're caught, man!

Effie (*recovering*). Oh, David!

Mrs. Ashton. What's that?

Effie. My David!

[*Robert goes out unobserved.*]

Mrs. Ashton. You said the other man was David.

Effie. This is David. The other—Oh!

Mrs. Ashton. Speak, wench!

Effie. I didn't see properly. I'd fainted or something. I thought he looked queer. . . . But *this* is David!

1st. Bow Street Runner Are you certain?

Effie. Perfectly. Sure and certain.

1st. Bow Street Runner. Are you playing tricks on us, child?

Effie. Oh no! I wouldn't for worlds. I'd be too frightened!

1st. Bow Street Runner handcuffs David unexpectedly and then says: That's to make sure you don't slip through our fingers as that other scamp did.

[*Enter Robert in wild excitement* (*L.*).]

Robert. That other chap! Who was he? He's stolen my horse!

1st. Bow Street Runner. What's that?

Robert. My horse! My best horse! Bonnie! I left her by the gate and she's gone!

Mary. Isn't this absolutely——

Mrs. Ashton. Hold your tongue.

[*Mary glances at Nancy who nods. Both are deliriously happy*]

Robert. I can't afford to lose that horse

Mrs Ashton *And* the fifty pounds reward!

1st. Bow Street Runner (*to 2nd.*) Bring that fellow outside We'll investigate his claims Where's that key?

Mrs. Ashton Why, there it is! On the floor!

Robert. Just where Effie fainted!

Effie I must have fainted on seeing it.

Mrs. Ashton. Stuff and nonsense!

[*The door is opened and the 1st. Bow Street Runner whistles for assistance. Enter 3rd. and 4th. Bow Street Runners.*]

1st. Bow Street Runner Search through this house—upstairs and down. (*Men salute and depart.*) (*To 2nd Bow Street Runner.*) You guard the prisoner! I'll return in a few minutes

Effie. Don't be afraid, David. They can't touch you.

David. It looks as if they have more than touched me. (*Holds up wrists*)

Effie. They're bound to let you go.

David. Aye. It's all a mistake, like. Me feyther and me mother'll swear to me.

Robert Effie, do you know who that other man was?

Effie. He must have been uneasy or he wouldn't have run away as he did.

Mrs Ashton. But do you know, child?

Effie. No, Ma'am But he told some awful stories, didn't he? Saying he was David when he wasn't. I'm sure I don't know where he'll go to if he tells stories like that.

Mrs. Ashton. You're acting the simpleton It's my belief you've been acting a long, long time

Robert. Mine too!

Mary.
Nancy. } Oooooh!

[*Mrs. Ashton gazes earnestly at Effie who returns it without blinking*]

Effie. Do you know, Ma'am, I've been thinking. I wonder if that man who said he was my David was really that horrible

Jack Falconer. Wouldn't it be a queer go if he was!

[*All gaze at Effie in stupefaction*]

Effie. Well, I was only wondering——

[*1st. Bow Street Runner reappears in the doorway.*]

Robert. Have you got my horse back?

1st Bow Street Runner. The horse has got clean away and the man too. He was too sharp for us this time. Our luck's right out to-day. (*To 2nd. Bow Street Runner.*) Let that fellow go.

[*Robert makes a gesture of despair and exit. The others follow leaving Effie alone in the kitchen. She closes the door, locks it, flings the key into the air, catching it and laughing heartily.*]

Effie The horse got clean away! Good old Bonnie! Our luck's in to-day!

CURTAIN